

R15

Code No: 124DC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(Common to EEE, PTM)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1. Briefly explain the following:
- a) Promotional Elasticity of Demand. [2]
 - b) Delphi Technique. [3]
 - c) BEP Chart. [2]
 - d) Cobb-Douglas Production Function. [3]
 - e) Types of Monopoly [2]
 - f) Pricing under Monopoly [3]
 - g) Average Rate of Return [2]
 - h) Significance of Capital budgeting [3]
 - i) Advantages of Double Entry System [2]
 - j) Earnings per 4 share. [3]

PART-B

(50 Marks)

- 2.a) Define Managerial Economics. Explain the difference between micro and macro economics.
- b) Discuss briefly the various methods of demand forecasting for a new product. [5+5]

OR

3. Define 'Elasticity of Demand'. How it is classified? What factors influence price elasticity? [10]

- 4.a) How is business organization focus on reduction of cost with economies of scale?
- b) What is Iso-Quants? Explain features and types of iso-quants. [5+5]

OR

- 5.a) You are given the following information for the year 2003 of XYZ Co. Ltd:

Variable Cost	6,00,000	60%
Fixed Cost	3,00,000	30%
Net Profit	1,00,000	10%
	<u>10,00,000</u>	<u>100%</u>

Find out i) Break Even Point in units and sales ii) PV Ratio iii) Margin of Safety iv) Number of units that must be sold to earn a profit of 5,00,000 v) How many units must be sold to earn a net income of 13.5% of sales.

- b) What is Cost function? Explain short run cost function briefly. [5+5]

- 6.a) Explain the concept of price determination in perfect market competition based on time.
- b) Define public enterprises. Explain advantages and limitations of various public enterprises. Under what conditions Government can enter into business? [5+5]

OR

- 7.a) Define partnership. Explain role, responsibilities and duties of a partner.
- b) Explain the difference between perfect market and monopoly. [5+5]

- 8.a) What do you understand by 'working capital cycle'. What are its components? Show diagrammatically?

- b) Explain various sources of capital. [5+5]

OR

- 9.a) The Alpha co Ltd. is considering the purchase of a new machine. Two alternative machine (A and B) have been suggested each costing Rs. 4,00,000. Earning after taxation are expected to be as follows:

Year	Cash Flows	
	Machine A	Machine B
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3	1,60,000	2,00,000
4	2,40,000	1,20,000
5	1,60,000	80,000

The Company has targeted return on capital 10% and on this basis, you are required to compare the profitability of the machines and state which alternative you consider financially preferable.

- b) Distinguish between 'Fixed capital' and 'working capital'. Discuss in detail various factors that influence the volume of working capital required by a manufacturing organization. [5+5]

10.a) Prepare Journal Entries and Ledger Accounts (Cash A/c, Arvind Walia A/c, Amrit Lal A/c, Bank A/c, Sales A/c) from the following transactions in Imran books

	RS.
1-June-1996 Started Business with cash	45,000
1-June-1996 Paid into Bank	25,000
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3-June-1996 Purchase of furniture and payment by cheque	5,000
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10-June-1996 Goods purchased from Amrit Lal	7,000
12-June-1996 Goods returned to Amrit Lal	1,000
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28-June-1996 Cash paid to Amrit Lal in full settlement of his A/c	5,940
30-June-1996 Paid for Stationery 200, Rent 1,000 Salaries 2,500	

b) From the following Balance Sheet of Depika Ltd; compute i) Equity ratio of Proprietary Ratio ii) Debt-Equity Ratio iii) Funded debt to capitalization ratio iv) Fixed Assets to Net Worth Ratio v) Solvency Ratio vi) Current Ratio to Proprietor's Fund Ratio vii) Fixed Assets Ratio. [5+5]

Liabilities	Amount	Assets	Amount
Equity Share Capital	3,00,000	Goodwill	90,000
9% Preference Share Capital	1,50,000	Land & Building	1,00,000
Reserve Fund	50,000	Plant & Machinery	2,50,000
Profit & Loss A/c	20,000	Equipment	60,000
Share Premium	10,000	Furniture & Fittings	80,000
8% Debentures	2,00,000	Sundry Debtors 92,000	
6% Mortgage Loan	60,000	Less Provisions 2,000	90,000
Sundry Creditors	80,000	Bills Receivables	1,00,000
Income Tax Provision	20,000	Stock in hand	1,20,000
Depreciation Fund	50,000	Cash	45,500
		Prepaid insurance	1,500
		Preliminary Expenses	2,000
		Discount on Issue of	
		Debentures	1,000
	9,40,000		9,40,000

OR

11.a) What is ratio? Explain various types of ratios and its advantages.

b) From the following balances and adjustments prepare final accounts as on 31.03.2013

Purchases	65,000	Bank Overdraft	8,000
Sales	1,20,000	Capital Account	60,000
Opening Stock	15,000	Bad Debts Reserve	2,500
Purchase Returns	1,500	Debtors Discount Reserve	2,000
Sales Returns	2,000	Plant & Machinery	20,000
Sundry Creditors	18,000	Land & Buildings	50,000
Salaries	4,000	Factory Expenses	600
Carriage	800	Wages	600
Bills Payable	10,000	Insurance	600
Advertisements Exp.	1,500	General Expenses	400
Commission paid	200	Sundry Debtors	15,000
Bad Debts	400	Bills Receivables	19,000
Discount (Dr.)	300	Cash in Hand	600
Creditors Discount Reserve	800	Drawings	2,400
Goodwill	20,000		

Adjustment:

i) Closing Stock Rs. 12,000

ii) Prepaid Insurance Rs. 150

iii) Outstanding Expenses Wages Rs. 400, Salaries Rs. 1,200

iv) Bad Debts to be written off Rs. 600 and provide Bad Debts Reserve @ 5% on Debtors

v) Provide 2% Discount Reserve on Debtors and Creditors

vi) Depreciation is to be calculated 10% on Plant and Machinery and 5% on Land and Buildings. [5+5]

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R15

Code No: 124CZ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

KINEMATICS OF MACHINES
(Common to ME, MCT, MSNT)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Define mechanical advantage and transmission angle of a mechanism. [2]
- b) What is a kinematic pair? Classify kinematic pairs according to nature of relative motion. [3]
- c) Name all the inversions of slider-crank mechanism with one application for each Inversion. [2]
- d) Briefly explain about coriolis acceleration component. [3]
- e) What is scott-russel mechanism? What is its limitation? [2]
- f) Briefly explain Ackermann steering gear. [3]
- g) Define base circle, pitch circle and pressure angle for cams. [2]
- h) What is undercutting in cams? Explain. [3]
- i) What type of gears are used for intersecting shafts? Explain. [2]
- j) What is the difference between simple and compound gear trains? [3]

PART-B

(50 Marks)

- 2.a) What are the inversions of a four bar chain? Explain in detail.
- b) A crank-rocker mechanism has a 60 mm fixed link, a 30mm crank, 50mm coupler and a 60 mm rocker. Draw the mechanism and determine the maximum and minimum transmission angles. [4+6]

OR

- 3.a) What are different types of constrained motion? Explain them in detail.
- b) The length of a fixed link of a crank and slotted-lever mechanism is 250 mm and that of crank is 100 mm. Determine the Inclination of the slotted lever with the vertical in the extreme position and also find the quick-return ratio. [5+5]

- 4.a) Define instantaneous centre of rotation. State and prove Kennedy's theorem as applicable to instantaneous centres of rotation of three bodies.
- b) In a slider crank mechanism, the lengths of the crank and the connecting rod are 200 mm and 800mm respectively. When the crank has turned 30° from its inner dead centre and it rotates at 40 rad/sec, find the velocity of slider. [5+5]

OR

5. For the configuration of a slider-crank mechanism shown in the figure 1, calculate the:
- Acceleration of the slider B
 - Acceleration of the point E
 - Angular acceleration of the link AB, OA rotates at 20rad/s CCW. [10]

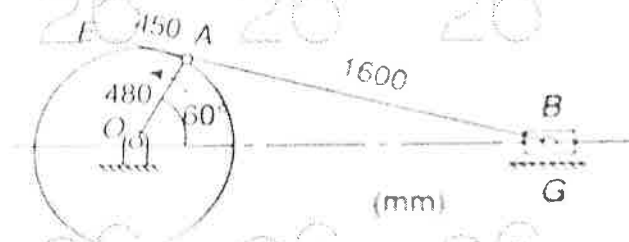


Figure: 1

- Enumerate straight-line mechanisms. Why are they classified into exact and approximate straight-line mechanisms? Sketch all the mechanisms.
- Sketch a paucellier mechanism. Prove that it can be used to trace a straight line. [5+5]

OR

- What is an automobile steering gear? What are its types? Which steering gearing is preferred and why?
- Derive an expression for the ratio of angular velocities of the shafts of a hooke's joint. [5+5]

8. Draw the profile of a cam operating a knife-edge follower having a lift of 30 mm the cam raises the follower with SHM for 150° of the rotation followed by a period of dwell for 60° . The follower descends for the next 100° rotation of the cam with uniform velocity again followed by a dwell period. The cam rotates at uniform velocity of 120 rpm and has a least radius of 20mm. [10]

OR

- What is a follower? Discuss about different types of followers.
- Deduce the expressions for the velocity and acceleration of the follower when it moves with simple harmonic motion. [5+5]

10.a) Discuss the various terms used in gear terminology and explain them with a neat sketch.

b) Derive expressions for arc of contact of pinion and gear with a neat sketch. [5+5]

OR

11.a) What is meant by interference in involute gears? Explain.

b) Below figure 2 shows a gear train in which gears D-E and F-G are compound gears. D gears with F; and G gears with C. the numbers of teeth on each gear are $A=30$ $B=120$, $C=135$, $D=30$, $E=75$, $F=30$, $G=60$. If the wheel A is fixed and the arm makes 20 revolutions clockwise, find the revolutions of B and C. [4+6]

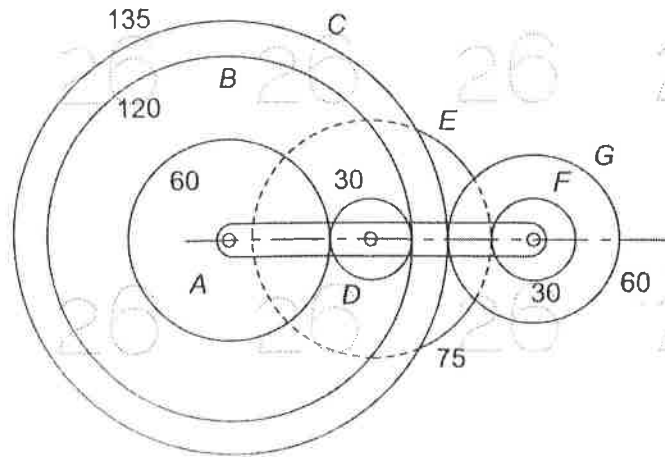


Figure: 2

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R15

Code No: 124CU

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

(Common to ECE, ETM)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) Find Electric field intensity due to the charge distribution ρ_v . [2]
- b) Write Poisson's and Laplace equations. [3]
- c) State Biot-Savart's law. [2]
- d) Calculate the self inductance per unit length of an infinitely long solenoid. [3]
- e) Write a wave equation in a lossy, charge free medium based on Maxwell's Equation. [2]
- f) What is Brewster angle? Write its equation. [3]
- g) What is condition for distortion less transmission line? [2]
- h) Explain how Quarter wave transformer is used for matching? [3]
- i) What is the value of characteristic impedance and reflection coefficient for an open circuited line? [2]
- j) What are the characteristics of Smith chart? [3]

PART-B**(50 Marks)**

- 2.a) Point charges $5nC$ and $-2nC$ are located at $(2,0,4)$ and $(-3,0,5)$, respectively. Find the electric field at $(1,-3,7)$.
 - b) Given that $E=(3x^2+y_0a_x+xa_y)$ kV/m, find the work done in moving a $-2\mu C$ charge from $(0,5,0)$ to $(2,-1,0)$ by taking the path. [5+5]
- OR**
- 3.a) An electric dipole of $100a_z pC.m$ is located at the origin. Find V and E at point $(1,\pi/3,\pi/2)$.
 - b) Three point charges $-1nC$, $4nC$, and $3nC$ are located at $(0,0,0)$, $(0,0,1)$ and $(1,0,0)$ respectively. Find the energy in the system. [5+5]
- 4.a) A circular loop located on $x^2+y^2=9, z=0$ carries a direct current of $10A$ along a_ϕ . Determine H at $(0,0,4)$ and $(0,0,-4)$.
 - b) In a certain conducting region, $H=yz(x^2+y^2)a_x-y^2xza_y+4x^2y^2a_z$ mA/m. Determine J at $(5,2,-3)$. [5+5]

OR

- 5.a) State Maxwell's equations in an integral and word form.
- b) A unit normal vector from region 2 ($\mu=2\mu_0$) to region 1 ($\mu=\mu_0$) is $a_{n21}=(6a_x+2a_y-3a_z)/7$. If $H_1=10a_x+a_y+12a_z$ A/m and $H_2=H_{2x}a_x-5a_y+4a_z$ A/m. Determine H_{2x} . [5+5]

6.a) A lossy material has $\mu=5\mu_0$, $\epsilon=\epsilon_0$. If at 5 MHz, the phase constant is 10 rad/m, calculate the loss tangent, conductivity of the material, complex permittivity attenuation constant and intrinsic impedance.

b) Derive the equation for intrinsic impedance in lossless dielectrics. [5+5]

OR

7.a) Determine the Fresnel coefficients for oblique incidence from lossless medium 1 to lossless medium 2 for parallel polarization.

b) Region 1 is a lossless medium for which $y \geq 0$, $\mu=\mu_0$, $\epsilon=4\epsilon_0$, whereas region 2 is free space, $y \leq 0$. If a plane wave $E=5\cos(108t+\beta t)a_z$ V/m exists in region 1, find the time average pointing vector. [5+5]

8.a) A transmission line operating at 500MHz has $Z_0=80\Omega$, Propagation constant = 0.04 Np/m, $\beta=1.5$ rad/m. Find the line parameters R, L, G and C?

b) Find the Z_{in} at any point on the line in terms load impedance starting from voltage and current wave equations on line. [5+5]

OR

9.a) For a lossless two wire transmission line show that the Characteristic impedance $Z_0 = \frac{120}{\sqrt{\epsilon_r}} \cosh^{-1} \frac{d}{2a}$.

b) A lossless transmission line operating at 4.5GHz has $L=2.4\mu\text{H/m}$ and $Z_0=85\Omega$. Calculate the phase constant and the phase velocity. [5+5]

10.a) A 500Ω lossless line has $V_L = 10e^{j25^\circ}$ V and $Z_L = 50e^{j30^\circ}$ Ω . Find the current at $\lambda/4$ from the load?

b) A 60Ω air line operating at 20MHz is 10m long. If the input impedance is $90 + j150\Omega$. Calculate Z_L , Γ and S. [5+5]

OR

11. Explain how double stub is used for matching with suitable diagram? Derive equations for its length and location. [10]

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R15

Code No: 124CN

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

COMPUTER ORGANIZATION
(Computer Science and Engineering)

Time: 3 Hours

Max. Marks: 75

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PART- A

(25 Marks)

- 1.a) Give an example each of Zero-address, One-address, two-address and three-address instruction. [2]
- b) Write a program that can evaluate the expression $A * B + C * D$, in a single-accumulator processor. Assume that the processor has Load, store, Multiply, and Add instructions and that all values fit in the accumulator. [3]
- c) What is the basic advantage of using interrupt-initiated data transfer over transfer under program control without an interrupt? [2]
- d) What are the functions of typical I/O interface? [3]
- e) Explain the terms Hit Ratio and Miss ratio. [2]
- f) How many 128×8 RAM chips are needed to provide a memory capacity of 2048 bytes? How many lines of address bus must be used to access 2048 bytes of memory? How many of these lines will be common to all chips? [3]
- g) In Intel microprocessor what is meant by segment register? [2]
- h) What are the functions of flag registers in 8086 microprocessor? [3]
- i) List few branch and call instructions. [2]
- j) What are assembler directives? [3]

PART-B

(50 Marks)

- 2.a) Explain different functional units of a digital computer.
- b) Mention the four types of operations to be performed by an instruction in a computer. What are the basic types of instruction formats? Give examples. [5+5]

OR

- 3.a) What is an interrupt? What are the uses of interrupts? Explain about the different type of interrupts?
- b) What is an addressing mode? List the different types of addressing modes. Explain index addressing mode with example program. [5+5]
- 4.a) A CPU with a 20-MHz clock is connected to a memory unit whose access time is 40 ns. Formulate a read and write timing diagram using a READ strobe and a WRITE strobe. Include the address in the timing diagram.
- b) Describe in detail about IOP organization. [4+6]

OR

- 5.a) Describe the data transfer method using DMA.
- b) Why are the read and write control lines in a DMA controller bi-directional? Under what condition and for what purpose are they used as inputs? Under what condition and for what purpose they used as outputs? [5+5]

6.a) Consider a processor running a program. 30% of the instructions of which require a memory read or write operation if the cache hit ratio is 0.95 for instructions and 0.9 for data. When a cache hit occurs for instruction or for data, only one clock is needed while the cache miss penalty is 17 clocks to read/write on the main memory. Work out the time saved by using the cache, given the total number of instructions executed is 1 million.

b) Explain in detail about associative mapping technique. [4+6]

OR

7.a) A magnetic disk system has the following parameters:

T_s = average time to position the magnetic head over a track

R = rotation speed of disk in revolutions per second

N_t = number of bits per track

N_s = number of bits per sector

Calculate the average time T_a that it will take to read bits per inch?

b) Explain in detail about virtual memory. [4+6]

8.a) What is pipelining? What are its principles?

b) Describe with examples how a 20-bit physical address of an instruction is generated in 8086 microprocessor? Explain the functions of following pins in 8086 microprocessor:

i) NMI

ii) DEN

iii) QS_0 - QS_1 .

[5+5]

OR

9.a) Write the special functions of general purpose registers.

b) Register R5 is used in a program to point to the top of a stack. Write a sequence of instructions using the Index, Autoincrement, and Autodecrement addressing modes to perform each of the following tasks:

i) Pop the top two items of the stack, add them, and then push the result onto the stack.

ii) Copy the fifth item from the top into register R3.

iii) Remove the top ten items from the stack.

[4+6]

10. Write an ALP for sorting Ascending and Descending order of a series. [10]

OR

11. Describe with the neat diagram the architecture of 8086 Microprocessor. [10]

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B.Tech II Year II Semester Examinations, December - 2017

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R13

Code No: 114CN

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

COMPUTER ORGANIZATION
(Computer Science and Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Give an example each of Zero-address, One-address, two-address and three-address instruction. [2]
- b) Write a program that can evaluate the expression $A * B + C * D$, in a single-accumulator processor. Assume that the processor has Load, store, Multiply, and Add instructions and that all values fit in the accumulator. [3]
- c) What is the basic advantage of using interrupt-initiated data transfer over transfer under program control without an interrupt? [2]
- d) What are the functions of typical I/O interface? [3]
- e) Explain the terms Hit Ratio and Miss ratio. [2]
- f) How many 128×8 RAM chips are needed to provide a memory capacity of 2048 bytes? How many lines of address bus must be used to access 2048 bytes of memory? How many of these lines will be common to all chips? [3]
- g) In Intel microprocessor what is meant by segment register? [2]
- h) What are the functions of flag registers in 8086 microprocessor? [3]
- i) List few branch and call instructions. [2]
- j) What are assembler directives? [3]

PART-B

(50 Marks)

- 2.a) Explain different functional units of a digital computer.
- b) Mention the four types of operations to be performed by an instruction in a computer. What are the basic types of instruction formats? Give examples. [5+5]

OR

- 3.a) What is an interrupt? What are the uses of interrupts? Explain about the different type of interrupts?
- b) What is an addressing mode? List the different types of addressing modes. Explain index addressing mode with example program. [5+5]
- 4.a) A CPU with a 20-MHz clock is connected to a memory unit whose access time is 40 ns. Formulate a read and write timing diagram using a READ strobe and a WRITE strobe. Include the address in the timing diagram.
- b) Describe in detail about IOP organization. [4+6]

OR

- 5.a) Describe the data transfer method using DMA.
- b) Why are the read and write control lines in a DMA controller bi-directional? Under what condition and for what purpose are they used as inputs? Under what condition and for what purpose they used as outputs? [5+5]

6.a) Consider a processor running a program. 30% of the instructions of which require a memory read or write operation if the cache hit ratio is 0.95 for instructions and 0.9 for data. When a cache hit occurs for instruction or for data, only one clock is needed while the cache miss penalty is 17 clocks to read/write on the main memory. Work out the time saved by using the cache, given the total number of instructions executed is 1 million.

b) Explain in detail about associative mapping technique. [4+6]

OR

7.a) A magnetic disk system has the following parameters:

T_s = average time to position the magnetic head over a track

R = rotation speed of disk in revolutions per second

N_t = number of bits per track

N_s = number of bits per sector

Calculate the average time T_a that it will take to read bits per inch?

b) Explain in detail about virtual memory. [4+6]

8.a) What is pipelining? What are its principles?

b) Describe with examples how a 20 bit physical address of an instruction is generated in 8086 microprocessor? Explain the functions of following pins in 8086 microprocessor:

i) NMI

ii) DEN

iii) $QS_0 - QS_1$.

[5+5]

OR

9.a) Write the special functions of general purpose registers.

b) Register R5 is used in a program to point to the top of a stack. Write a sequence of instructions using the Index, Autoincrement, and Autodecrement addressing modes to perform each of the following tasks:

i) Pop the top two items of the stack, add them, and then push the result onto the stack.

ii) Copy the fifth item from the top into register R3.

iii) Remove the top ten items from the stack.

[4+6]

10. Write an ALP for sorting Ascending and Descending order of a series. [10]

OR

11. Describe with the neat diagram the architecture of 8086 Microprocessor. [10]

R13

Code No: 114CZ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

KINEMATICS OF MACHINES

(Common to ME, MCT)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Define mechanical advantage and transmission angle of a mechanism. [2]
- b) What is a kinematic pair? Classify kinematic pairs according to nature of relative motion. [3]
- c) Name all the inversions of slider-crank mechanism with one application for each inversion. [2]
- d) Briefly explain about coriolis acceleration component. [3]
- e) What is scott-russel mechanism? What is its limitation? [2]
- f) Briefly explain Ackermann steering gear. [3]
- g) Define base circle, pitch circle and pressure angle for cams. [2]
- h) What is undercutting in cams? Explain. [3]
- i) What type of gears are used for intersecting shafts? Explain. [2]
- j) What is the difference between simple and compound gear trains? [3]

PART-B

(50 Marks)

- 2.a) What are the inversions of a four bar chain? Explain in detail.
- b) A crank-rocker mechanism has a 60 mm fixed link, a 30mm crank, 50mm coupler and a 60 mm rocker. Draw the mechanism and determine the maximum and minimum transmission angles. [4+6]

OR

- 3.a) What are different types of constrained motion? Explain them in detail.
- b) The length of a fixed link of a crank and slotted-lever mechanism is 250 mm and that of crank is 100 mm. Determine the Inclination of the slotted lever with the vertical in the extreme position and also find the quick-return ratio. [5+5]

- 4.a) Define instantaneous centre of rotation. State and prove Kennedy's theorem as applicable to instantaneous centres of rotation of three bodies.
- b) In a slider crank mechanism, the lengths of the crank and the connecting rod are 200 mm and 800mm respectively. When the crank has turned 30° from its inner-dead-centre and it rotates at 40 rad/sec, find the velocity of slider. [5+5]

OR

5. For the configuration of a slider-crank mechanism shown in the figure 1, calculate the:
- a) Acceleration of the slider B
- b) Acceleration of the point E
- c) Angular acceleration of the link AB, OA rotates at 20rad/s CCW. [10]

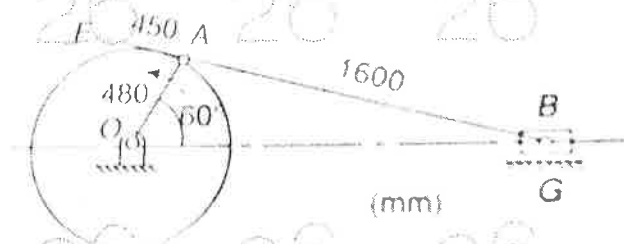


Figure: 1

- 6.a) Enumerate straight-line mechanisms. Why are they classified into exact and approximate straight-line mechanisms? Sketch all the mechanisms.
- b) Sketch a paucellier mechanism. Prove that it can be used to trace a straight line. [5+5]

OR

- 7.a) What is an automobile steering gear? What are its types? Which steering gearing is preferred and why?
- b) Derive an expression for the ratio of angular velocities of the shafts of a hooke's joint. [5+5]

8. Draw the profile of a cam operating a knife-edge follower having a lift of 30 mm the cam raises the follower with SHM for 150° of the rotation followed by a period of dwell for 60° . The follower descends for the next 100° rotation of the cam with uniform velocity again followed by a dwell period. The cam rotates at uniform velocity of 120 rpm and has a least radius of 20mm. [10]

OR

- 9.a) What is a follower? Discuss about different types of followers.
- b) Deduce the expressions for the velocity and acceleration of the follower when it moves with simple harmonic motion. [5+5]

- 10.a) Discuss the various terms used in gear terminology and explain them with a neat sketch.
- b) Derive expressions for arc of contact of pinion and gear with a neat sketch. [5+5]
- OR**
- 11.a) What is meant by interference in involute gears? Explain.
- b) Below figure 2 shows a gear train in which gears D-E and F-G are compound gears. D gears with F; and G gears with C. the numbers of teeth on each gear are $A=30$ $B=120$, $C=135$, $D=30$, $E=75$, $F=30$, $G=60$. If the wheel A is fixed and the arm makes 20 revolutions clockwise, find the revolutions of B and C. [4+6]

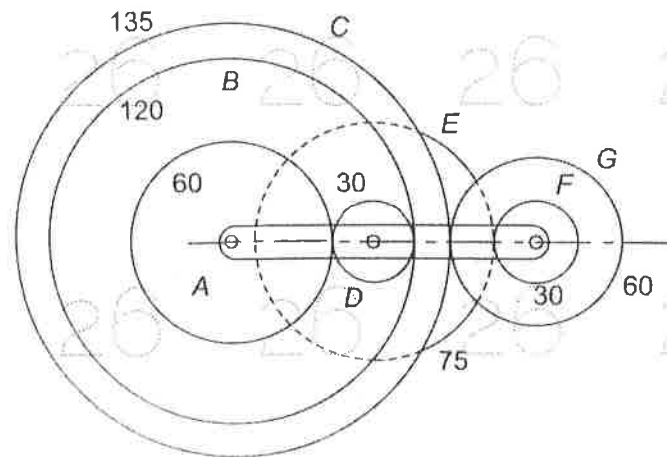


Figure: 2

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R13

Code No: 114CU

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

(Electronics and Communication Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Find Electric field intensity due to the charge distribution ρ_v . [2]
- b) Write Poisson's and Laplace equations. [3]
- c) State Biot-Savart's law. [2]
- d) Calculate the self inductance per unit length of an infinitely long solenoid. [3]
- e) Write a wave equation in a lossy, charge free medium based on Maxwell's Equation. [2]
- f) What is Brewster angle? Write its equation. [3]
- g) What is condition for distortion less transmission line? [2]
- h) Explain how Quarter wave transformer is used for matching? [3]
- i) What is the value of characteristic impedance and reflection coefficient for an open circuited line? [2]
- j) What are the characteristics of Smith chart? [3]

PART-B

(50 Marks)

- 2.a) Point charges 5nC and -2nC are located at $(2,0,4)$ and $(-3,0,5)$, respectively. Find the electric field at $(1,-3,7)$.
- b) Given that $E=(3x^2+y_0a_x+xa_y)$ kV/m, find the work done in moving a $-2\mu\text{C}$ charge from $(0,5,0)$ to $(2,-1,0)$ by taking the path. [5+5]

OR

- 3.a) An electric dipole of $100a_z\text{pC}\cdot\text{m}$ is located at the origin. Find V and E at point $(1,\pi/3,\pi/2)$.
- b) Three point charges -1nC , 4nC , and 3nC are located at $(0,0,0)$, $(0,0,1)$ and $(1,0,0)$ respectively. Find the energy in the system. [5+5]

- 4.a) A circular loop located on $x^2+y^2=9$, $z=0$ carries a direct current of 10A along a_ϕ . Determine H at $(0,0,4)$ and $(0,0,-4)$.
- b) In a certain conducting region, $H=yz(x^2+y^2)a_x-y^2xza_y+4x^2y^2a_z\text{mA/m}$. Determine J at $(5,2,-3)$. [5+5]

OR

- 5.a) State Maxwell's equations in an integral and word form.
- b) A unit normal vector from region 2 ($\mu=2\mu_0$) to region 1 ($\mu=\mu_0$) is $a_{n21}=(6a_x+2a_y-3a_z)/7$. If $H_1=10a_x+a_y+12a_z$ A/m and $H_2=H_{2x}a_x-5a_y+4a_z$ A/m. Determine H_{2x} . [5+5]

6.a) A lossy material has $\mu=5\mu_0$, $\epsilon=\epsilon_0$. If at 5 MHz, the phase constant is 10 rad/m, calculate the loss tangent, conductivity of the material, complex permittivity attenuation constant and intrinsic impedance.

b) Derive the equation for intrinsic impedance in lossless dielectrics. [5+5]

OR

7.a) Determine the Fresnel coefficients for oblique incidence from lossless medium 1 to lossless medium 2 for parallel polarization.

b) Region 1 is a lossless medium for which $y \geq 0$, $\mu=\mu_0$, $\epsilon=4\epsilon_0$, whereas region 2 is free space, $y \leq 0$. If a plane wave $E=5\cos(108t+\beta t)a_z$ V/m exists in region 1, find the time average pointing vector. [5+5]

8.a) A transmission line operating at 500MHz has $Z_0=80\Omega$, Propagation constant = 0.04 Np/m, $\beta=1.5$ rad/m. Find the line parameters R, L, G and C?

b) Find the Z_{in} at any point on the line in terms load impedance starting from voltage and current wave equations on line. [5+5]

OR

9.a) For a lossless two wire transmission line show that the Characteristic impedance $Z_0 = \frac{120}{\sqrt{\epsilon_r}} \cosh^{-1} \frac{d}{2a}$.

b) A lossless transmission line operating at 4.5GHz has $L=2.4\mu\text{H/m}$ and $Z_0=85\Omega$. Calculate the phase constant and the phase velocity. [5+5]

10.a) A 500Ω lossless line has $V_L = 10e^{j25^\circ}$ V and $Z_L = 50e^{j30^\circ}\Omega$. Find the current at $\lambda/4$ from the load?

b) A 60Ω air line operating at 20MHz is 10m long. If the input impedance is $90 + j150\Omega$. Calculate Z_L , Γ and S. [5+5]

OR

11. Explain how double stub is used for matching with suitable diagram? Derive equations for its length and location. [10]

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R09

Code No: 54018

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, December - 2017

NUMERICAL METHODS

(Common to ME, MIE)

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

- 1.a) Find up to the four places of decimals the smallest root of the equation:
 $e^{-x} = \sin x$ using Newton-Raphson method.
- b) Give the graphical interpretation of the method of false position. [8+7]
- 2.a) Gauss-Seidal method is similar in principle to Jacobi method. Then what is difference between them?
- b) Solve the following equations using Gauss-Elimination method.
 $2x_1 + x_2 + x_3 = 10$; $3x_1 + 2x_2 + 3x_3 = 18$; $x_1 + 4x_2 + 9x_3 = 16$. [5+10]
- 3.a) What is meant by Interpolation?
- b) If the interval of differencing is unity, prove that $\Delta \tan^{-1} \left(\frac{n-1}{n} \right) = \tan^{-1} \left(\frac{1}{2n^2} \right)$. [5+10]
- 4.a) Fit a polynomial of second degree to the data points (2, 3.07), (4, 12.85), (6, 31.47), (8, 57.38) and (10, 91.29).
- b) What is the principle of method of least square? [8+7]
- 5.a) What is numerical differentiation?
- b) A slider in a machine moves along a fixed straight rod. Its distance x cm along the rod is given below for various values of the time t seconds. Find the velocity of the slider and its acceleration when $t = 0.3$ second. [5+10]
- | | | | | | | | |
|-----|-------|-------|-------|-------|-------|-------|-------|
| t | 0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 |
| x | 30.13 | 31.62 | 32.87 | 33.64 | 33.95 | 33.81 | 33.24 |
6. Apply Milne's method to find a solution of the differential equation:
 $y' = x - y^2$, in the range $0 \leq x \leq 1$ for the initial condition $y(0) = 0$. [15]
7. Find the largest eigenvalue in modulus and the corresponding eigenvector of the matrix $\begin{bmatrix} -15 & 4 & 3 \\ 10 & -12 & 6 \\ 20 & -4 & 2 \end{bmatrix}$ using the power method. [15]
8. Solve the elliptic equation $u_{xx} + u_{yy} = 0$ inside the square boundary by the lines $x = 0, x = 4, y = 0, y = 4$ given that $u = x^2y^2$ on the boundary. [15]

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R09

Code No: 54010

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

SWITCHING THEORY AND LOGIC DESIGN

(Common to EEE, ECE)

Time: 3 hours

Max. Marks: 75

**Answer any five questions
All questions carry equal marks**

- 1.a) Convert the following number to Hexadecimal and decimal:
 - i) $(735.5)_8$
 - ii) $(101010111.01)_2$
- b) Perform the following subtraction in binary using 1's and 2's complement method
 $(6779)_{10} - (0899)_{10}$. [8+7]

- 2.a) Find the complement and dual of the given function $XY + X(WZ + WZ')$
- b) Reduce the following Boolean function to four literals and then draw the logic diagram $(A' + C)(A + C')(A + B + C'D)$ [7+8]

- 3.a) Simplify the following Boolean function using tabular method
 $F(A, B, C, D) = \sum(0, 6, 8, 13, 15) + d(1, 5, 9)$
- b) What are the prime implicants in a K-map method? Explain with one example. [9+6]

- 4.a) Design a 4×16 Decoder using 2×4 decoder and explain its operation.
- b) Design a 3-bit binary to Excess-3 code convertor and explain its operation. [7+8]

- 5.a) Implement the following Boolean function using PLA
 - i) $F_1 = \sum(1, 3, 5, 7)$
 - ii) $F_2 = \sum(0, 5, 6, 7)$
- b) List out the few comparisons of ROM, PLA and PAL. [9+6]

- 6.a) Design a circuit diagram of Sequence detector and explain its operation.
- b) Convert JK Flip-flop into D flip-flop and draw the circuit diagram and excitation table for it. [8+7]

- 7.a) Define Mealy and Moore machine? Explain its advantages and disadvantages.
- b) Explain the concept of Minimal cover table of state machine with example. [7+8]

- 8.a) Draw the ASM chart for Binary multiplier and explain its operation in detail.
- b) What are the different blocks presented in ASM chart and explain each block with one example. [8+7]

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R09

Code No: 54049

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

MOLECULAR BIOLOGY AND GENETICS

(Biotechnology)

Time: 3 hours

Max. Marks: 75

**Answer any five questions
All questions carry equal marks**

- 1.a) Describe the process of DNA replication in detail.
- b) Write a note on telomere and mention how they replicate. [7+8]
- 2.a) Write a detailed account of transcription apparatus.
- b) Discuss the processing of all three RNAs. [8+7]
- 3.a) Compare protein synthesis in prokaryotes and eukaryotes.
- b) Describe genetic code. [8+7]
- 4.a) Describe the organisation of nucleosome.
- b) Explain basic laws of inheritance. [8+7]
- 5.a) Describe two point and three point crosses.
- b) Explain mapping of genes by tetrad analysis by mitotic crossing over. [7+8]
- 6.a) Write about methods of transduction.
- b) Elucidate lytic cycle of bacteriophages. [7+8]
- 7.a) Discuss various types of DNA damages and repair mechanisms.
- b) Give an account of mutations. [8+7]
- 8.a) Write a note on extrachromosomal inheritance with suitable examples.
- b) Describe uniparental inheritance. [8+7]

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R07

Code No: V0222

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

LINEAR AND DIGITAL IC APPLICATIONS

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 80

**Answer any five questions
All questions carry equal marks**

- 1.a) Draw the equivalent circuit of an op-amp? Explain its operation.
- b) In an op-amp, $V_2 = 0$ (inverting terminal input). What is the voltage at V_1 (non inverting terminal input) for an output of 5V if $AOL=50000$.
- c) Explain the operation of precision full wave rectifier circuit. [5+6+5]
- 2.a) Explain and draw the output waveforms of the ideal integrator circuit when the input is square-wave.
- b) Explain the method of boosting the current of a three terminal voltage regulator. [8+8]
- 3.a) Define an all-pass filter. How can it be justifiably called a phase shift circuit?
- b) Design a narrowband band pass filter using op-amp. The resonant frequency is 100Hz and $Q=2$. Assume $C=0.1 \mu F$. [8+8]
- 4.a) With a neat functional block diagram explain the working of 555 Timer in astable mode.
- b) Explain how the IC 565 can be used as a FSK demodulator. [8+8]
- 5.a) Give the schematic circuit of integrating type A/D converter and explain the operation of this system and derive expression for output voltage V_o .
- b) Draw the circuit of a Ladder type DAC for 4 bits and derive expression for output voltage. [8+8]
- 6.a) Explain sinking current and sourcing current of TTL output. Which of the above parameters decide the fan-out and how?
- b) Draw the resistive model of a CMOS inverter and explain its behavior for LOW and HIGH outputs. [8+8]
- 7.a) Design a 1 to 4 demultiplexer module by using 2 to 4 decoder?
- b) Implement the 32 input to 5 output priority encoder using the four 74LS148 and gates. [8+8]
- 8.a) Differentiate between ripple counter and synchronous counter? Design a 4-bit counter in both modes and estimate the propagation delay.
- b) Differentiate between SRAM and DRAM. [8+8]

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R15

Code No: 224AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Pharmacy II Year II Semester Examinations, December-2017

PHARMACOGNOSY-I

Time: 3hours

Max.Marks:75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Define Pharmacognosy with suitable example. [2]
- b) Give the difference between organized and unorganized crude drugs. [3]
- c) Enumerate exogenous factors affecting cultivation of medicinal plants. [2]
- d) Discuss the role of auxins in growth regulation of plants. [3]
- e) Define sophistication and admixture terminology in adulteration. [2]
- f) Discuss in brief physical evaluation of crude drugs. [3]
- g) Differentiate between protein and enzymes. [2]
- h) Give the pharmaceutical applications of gum acacia and diastase [3]
- i) Give the biological source, chemical constituents and uses of castor oil [2]
- j) Define lipids. Give the biological source and uses of cod liver oil. [3]

PART-B

(50 Marks)

- 2.a) Discuss the contribution of various scientists in the development of pharmacognosy
 - b) Classify the crude drugs with suitable examples. [5+5]
- OR**
- 3.a) Explain the history of pharmacognosy
 - b) Explain chemical and alphabetic classification of crude drugs. [5+5]
- 4.a) Discuss the role of gibberellins in growth regulation of plants.
 - b) Explain the factors affecting cultivation. [5+5]
- OR**
- 5.a) Discuss various steps of collection and processing of crude drugs in short.
 - b) Explain the mechanical methods for pest control. [5+5]
- 6.a) Discuss various types of adulteration in short.
 - b) Explain microscopic evaluation of crude drugs. [5+5]
- OR**
- 7.a) Explain adulteration of crude drugs with substandard commercial varieties with examples.
 - b) Explain morphological evaluation of crude drugs. [5+5]

8.a) Discuss general properties of carbohydrates and proteins.

b) Give the biological source, chemical constituents, identification tests and uses of starch. [5+5]

OR

9.a) Give the systemic pharmacognostic study of gelatin.

b) Give biological source and uses of isabgol and pectin. [5+5]

10.a) Discuss chemical constituents of linseed and olive oils.

b) Give the biological source, chemical constituents, identification tests and uses of kokum butter. [5+5]

OR

11.a) Give the pharmaceutical applications of wool fat and lard.

b) Discuss pharmacognostic study of cocoa butter. [5+5]

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R15

Code No: 124DA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, December - 2017

MACHINE DRAWING

(Common to ME, MCT, AME, MSNT)

Time: 3 Hours

Max. Marks: 75

Answer any **THREE** questions from Part-A
Part-B is Compulsory

PART- A

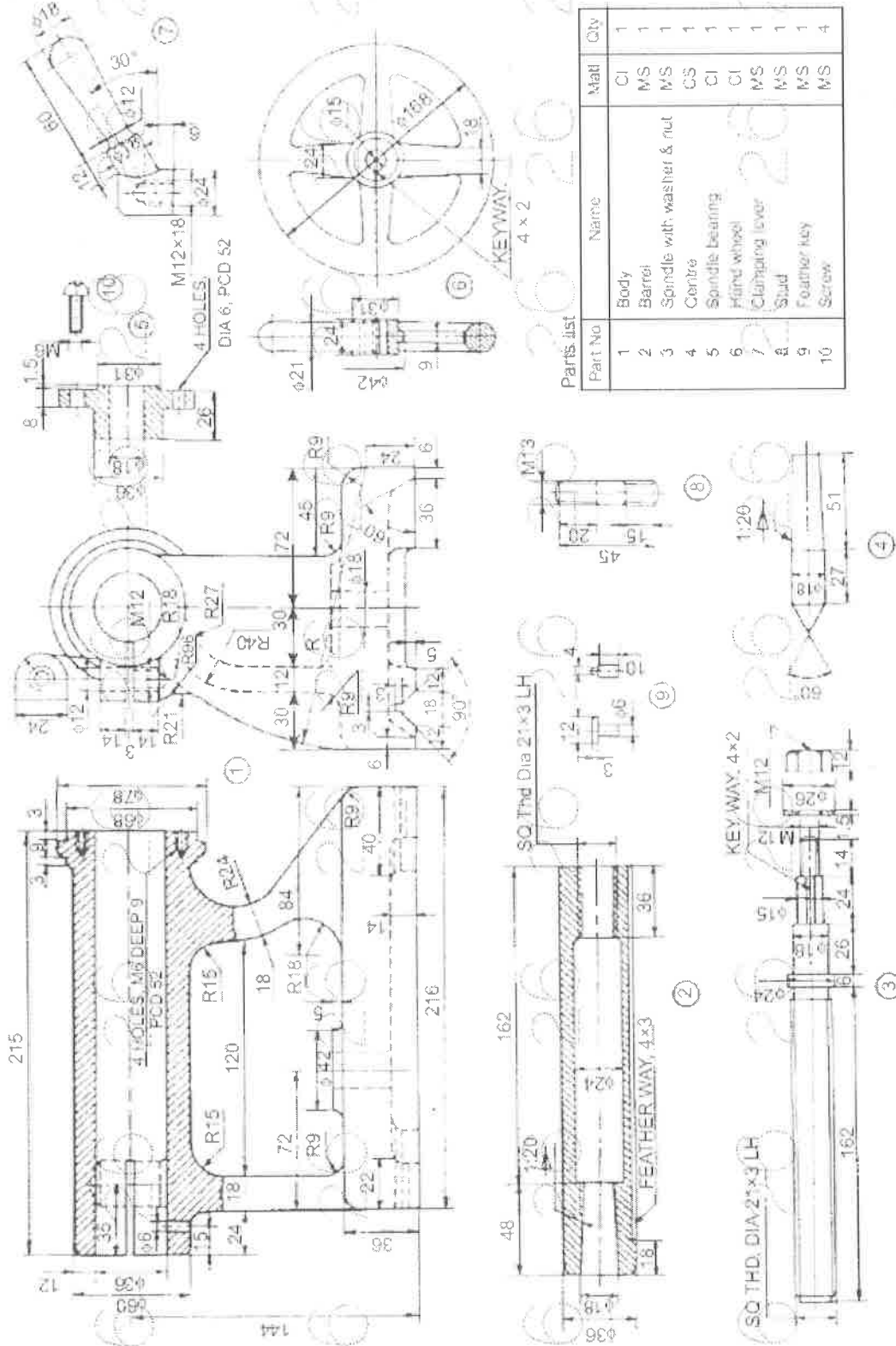
[3 × 10 = 30 Marks]

1. Sketch the following conventional materials.
a) Lead b) Wood c) Glass d) Steel e) Asbestos. [10]
2. Draw sectional front view and side view of the cotter and Gib joint for connecting two square rods of side 50 mm. Take proportionate dimensions. [10]
3. Draw the sectional front view and side view of a footstep bearing, for supporting a shaft of diameter 60 mm. Give all important proportionate dimensions. [10]
4. Draw the following thread profiles for a nominal diameter of 30 mm and pitch 3 mm and give their applications:
a) ACME thread
b) Worm thread
c) Square thread
d) Buttress thread. [10]

PART – B

(1 × 45 = 45 Marks)

5. Assemble all the parts of lathe tailstock shown in figure and draw sectional front view and right hand side view. [45]



Parts list

Part No	Name	Matd	Qty
1	Body	CI	1
2	Barrel	MS	1
3	Spindle with washer & nut	MS	1
4	Centre	CS	1
5	Spindle bearing	CI	1
6	Hand wheel	CI	1
7	Clamping lever	MS	1
8	Stud	MS	1
9	Feather key	MS	1
10	Screw	MS	4

R15

Code No: 124CX

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

JAVA PROGRAMMING

(Common to CSE, IT)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) Define data abstraction. [2]
- b) What is the size of char data type? Why does it differ from C language? [3]
- c) What is the use of anonymous inner class? [2]
- d) What is a package? How to define it and access it? [3]
- e) Differentiate between error and exception. [2]
- f) How to assign priorities to threads? [3]
- g) List the functions of Stack class. [2]
- h) What is the need of JDBC type 3, type 4 drivers? [3]
- i) What are the sources for item event? [2]
- j) Give the hierarchy for swing components. [3]

PART-B**(50 Marks)**

- 2.a) What feature of Java makes it platform independent and portable? [5+5]
 - b) Is Java a robust language? Justify your answer. [5+5]
- OR**
- 3.a) Differentiate between a class and object. [5+5]
 - b) Demonstrate constructor overloading concept. [5+5]
4. What is inheritance? Explain different forms of inheritance with suitable program segments and real world example classes. [10]
- OR**
- 5.a) Differentiate between interface and abstract class. [5+5]
 - b) What is meant by dynamic method dispatch? [5+5]
- 6.a) Write a program to illustrate the use of multiple catch blocks for a try block. [5+5]
 - b) What are the uses of 'throw' and 'throws' clauses for exception handling? [5+5]
- OR**
- 7.a) What is the difference between a thread and a process? [5+5]
 - b) How to achieve synchronization among threads? Write suitable code. [5+5]

- 8.a) What is a vector? How does it differ from array, list?
b) Write a program to count number of words in a given sentence. [5+5]

OR

- 9.a) Write a program to copy the contents of file1 to file2. Read the names of files as command line arguments.
b) Write about driver manager class for database connectivity. [5+5]

- 10.a) Why swing components are preferred over AWT components?
b) What is an adapter class? What is their role in event handling? [5+5]

OR

- 11.a) Explain the life cycle of an applet.
b) What are the various layout managers used in Java? [5+5]

---ooOoo---

R15

Code No: 124AF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

DIGITAL DESIGN USING VERILOG HDL

(Electronics and Communication Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Explain about strobe tasks. [2]
- b) Define logic levels relevant to verilog HDL. [3]
- c) What is drive strength of a device or gate in verilog. [2]
- d) Explain NOR gate primitive with example. [3]
- e) Define fork-join block. [2]
- f) Define force-release construct with an example. [3]
- g) Design verilog module for 4-bit full adder using dataflow operators. [2]
- h) What is recursive function [3]
- i) Write a short note on design verification. [2]
- j) Explain about implicit model. [3]

PART- B

(50 Marks)

- 2.a) Explain the synthesis procedure in verilog HDL.
- b) Classify the data types and explain. [5+5]

OR

- 3.a) Explain different levels of design description in verilog.
- b) What are the functions of programming language interface (PLI)? Explain. [5+5]

- 4.a) Write notes on tristate gates. Give the relevant syntax, logic diagrams and excitation tables.

- b) Discuss about strings in detail. [5+5]

OR

- 5.a) Explain continuous assignment structures with examples.
- b) Write about net delay with an example. [5+5]

- 6.a) Design verilog module to identify the highest priority interrupts.
- b) Write test bench simulation results of above question with explanation. [5+5]

OR

- 7.a) Write the differences between begin-end and fork-join blocks.
- b) Explain about multiple always blocks. [5+5]

- 8.a) What do you mean by user defined primitive? Explain the types with examples.
b) Explain briefly the module paths. [5+5]

OR

- 9.a) Discuss the basic transistor switches.
b) Explain the computer directives. [5+5]

- 10.a) Write and explain the verilog module for positive edge trigger flip-flop.
b) Discuss setup hold, width and period checks used in verilog. [5+5]

OR

- 11.a) Explain cross coupled NOR latch.
b) What are the various sequential memory storage models explain in detail. [5+5]

--ooOoo--

R15

Code No: 124AD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

POWER SYSTEMS - I

(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART - A**(25 Marks)**

- 1.a) What is the need of Control rods in nuclear plants? [2]
- b) What is the function of economizer? [3]
- c) What are the design features of distribution systems? [2]
- d) How the distribution systems are classified? [3]
- e) What are the merits and demerits of main and transfer bus bar system? [2]
- f) What are the advantages and disadvantages of Air insulated substations? [3]
- g) What are the methods used for improving power factor? [2]
- h) What are the merits of on load tap changing transformer? [3]
- i) Define the integrated load duration curves. [2]
- j) What are the desirable characteristics of tariff? [3]

PART - B**(50 Marks)**

2. Write different components which are used for increasing the efficiency of a thermal power station. Explain them in detail. [10]

OR

- 3.a) Draw a neat line diagram of a nuclear power plant showing basic components. Discuss the merits of nuclear power plant compare to thermal power plants.
- b) Explain with a neat diagram, the various parts of a nuclear reactor, mentioning clearly the function of each part. [5+5]
- 4.a) Compare underground and over head distribution systems.
- b) If the resistance of a distributor (both return and ground) is 0.05 ohm/m and the distributed load in section 'DE' is 1 A/m, find the current distribution and minimum voltage in the distributor as shown in below figure 1, when
 - i) Both the ends are at same potential and
 - ii) Potential difference between the ends 'A' and 'B' is 4 Volts. [5+5]

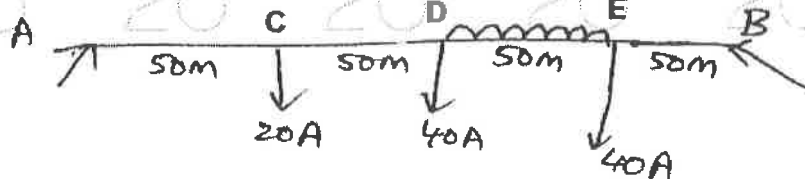


Figure 1

OR

5. A 3-phase distribution system is shown in below figure 2. Power is supplied at 'A' at a line voltage of 11kV and balance loads of 25A per phase at 0.8 p.f lag and 35A per phase at 0.9 p.f lag are taken at B and C. The impedance of the feeders are $Z_{AB} = (5+j9)\Omega$, $Z_{BC} = (6+j10)\Omega$ and $Z_{CA} = (4+j8)\Omega$. Calculate the voltages at B, C and D and the current in each branch. Load at mid point D of section BC is 10A at upf. Power factors are assumed with respect to voltage at 'A'. [10]

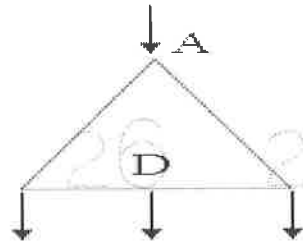


Figure 2

- 6.a) Make a list of the main equipment in a substation. Draw layout of a typical substation.
b) Explain the constructional aspects of gas insulated substations. [5+5]

OR

- 7.a) What is the difference between indoor and outdoor substations? What are the factors which are to be considered for a selection of a site of a substation?
b) Draw the single line diagram of a GIS. [5+5]

- 8.a) What are the sources for generation and absorption of reactive power in a given power system?
b) A synchronous motor having a power consumption of 40kW is connected in parallel with a load of 250 kW having a lagging p.f. of 0.85. If the combined load has a p.f of 0.95, what is the value of leading reactive kVA supplied by the motor and at what p.f is it working? [5+5]

OR

- 9.a) What are the various methods of voltage control? Explain the booster transformer for voltage control.
b) A single-phase motor connected to a 230 V, 50 Hz supply takes 25 A at a p.f of 0.8 lag. A capacitor is shunted across the motor terminals to improve the p.f to 0.95 lag. Determine the capacitance of the capacitor to be shunted across the motor terminals. [5+5]

10.a) Define and explain the following:

(i) Connected load (ii) Demand factor (iii) Diversity factor (iv) Plant use factor

b) A certain power station annual load duration curve is a straight line from 20 MW to 7MW. To meet this load, three turbine-generator units, two-rated at 12 MW each and one rated at 8 MW are installed. Calculate the following

i) Installed capacity

ii) Plant factor

iii) Units generated per annum

iv) Utilization factor

[5+5]

OR

11.a) What are the costs of electrical energy? Explain.

b) The data of a power station as follows:

Installed capacity

=250 MW

Capital cost

= Rs. 300×10^6

Rate of interest and depreciation

= 15%

Annual cost of fuel oil, salaries and taxation = Rs. 40×10^6

Load factor

= 0.7

Determine the cost of generation and cost of saving per kWh if the annual load factor is raised to 0.85.

[5+5]

R13

Code No: 114DA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, December - 2017

MACHINE DRAWING
(Common to ME, AME, MSNT)

Time: 3 Hours

Max. Marks: 75

Answer any **THREE** questions from Part-A
Part-B is Compulsory

PART- A

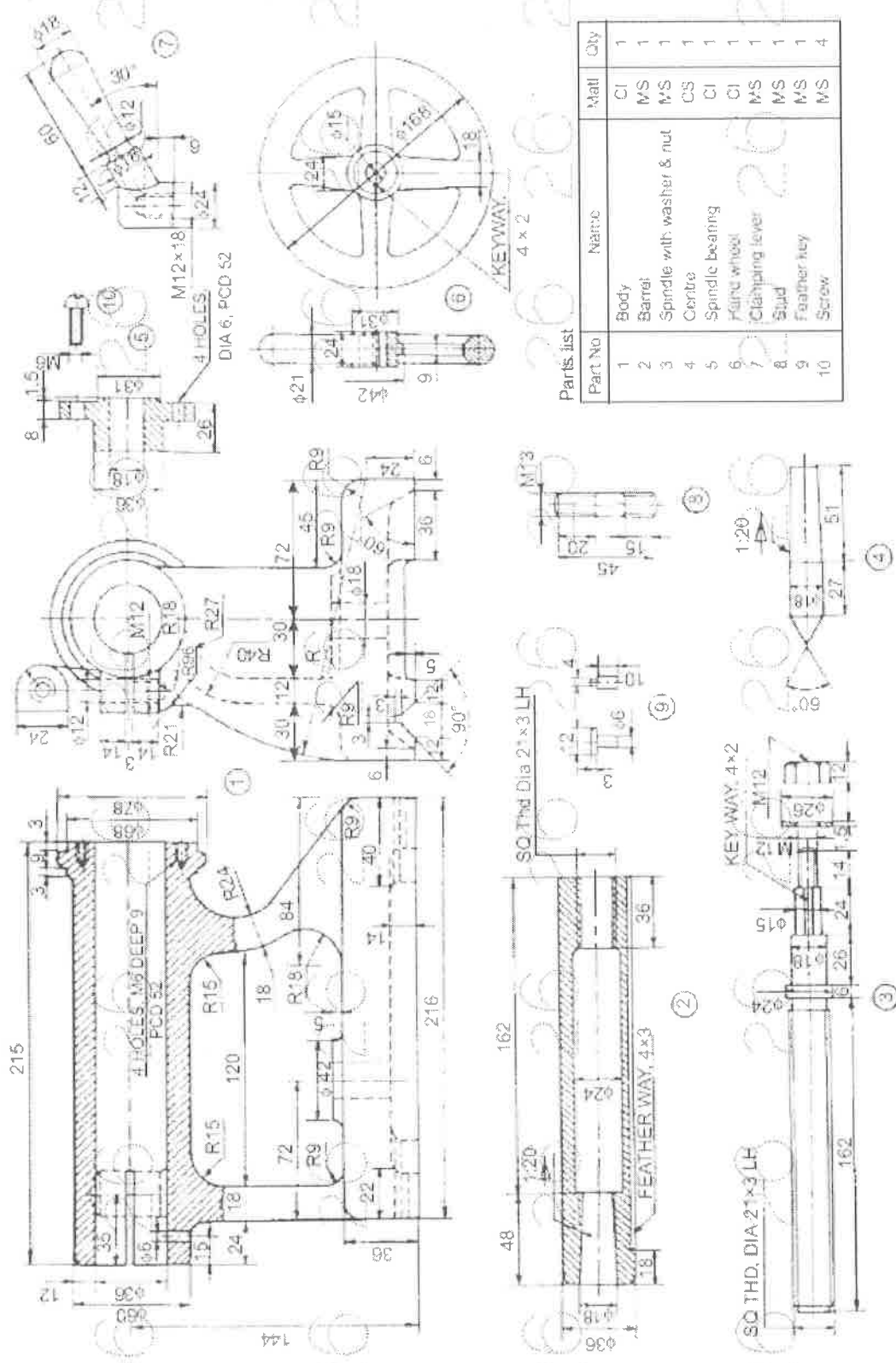
[3 × 10 = 30 Marks]

1. Sketch the following conventional materials.
a) Lead b) Wood c) Glass d) Steel e) Asbestos. [10]
2. Draw sectional front view and side view of the cotter and Gib joint for connecting two square rods of side 50 mm. Take proportionate dimensions. [10]
3. Draw the sectional front view and side view of a footstep bearing, for supporting a shaft of diameter 60 mm. Give all important proportionate dimensions. [10]
4. Draw the following thread profiles for a nominal diameter of 30 mm and pitch 3 mm and give their applications:
a) ACME thread
b) Worm thread
c) Square thread
d) Buttress thread. [10]

PART - B

(1 × 45 = 45 Marks)

5. Assemble all the parts of lathe tailstock shown in figure and draw sectional front view and right hand side view. [45]



Parts list

Part No	Name	Matl	Qty
1	Body	CI	1
2	Barrel	MS	1
3	Spindle with washer & nut	MS	1
4	Centre	CS	1
5	Spindle bearing	CI	1
6	Spindle wheel	CI	1
7	Clamping lever	MS	1
8	Stud	MS	1
9	Feather key	MS	1
10	Screw	MS	4

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R13

Code No: 114CX

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

JAVA PROGRAMMING

(Common to CSE, IT)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Define data abstraction. [2]
- b) What is the size of char data type? Why does it differ from C language? [3]
- c) What is the use of anonymous inner class? [2]
- d) What is a package? How to define it and access it? [3]
- e) Differentiate between error and exception. [2]
- f) How to assign priorities to threads? [3]
- g) List the functions of Stack class. [2]
- h) What is the need of JDBC type 3, type 4 drivers? [3]
- i) What are the sources for item event? [2]
- j) Give the hierarchy for swing components. [3]

PART-B

(50 Marks)

- 2.a) What feature of Java makes it platform independent and portable? [5+5]
 - b) Is Java a robust language? Justify your answer. [5+5]
- OR**
- 3.a) Differentiate between a class and object. [5+5]
 - b) Demonstrate constructor overloading concept. [5+5]
4. What is inheritance? Explain different forms of inheritance with suitable program segments and real world example classes. [10]
- OR**
- 5.a) Differentiate between interface and abstract class. [5+5]
 - b) What is meant by dynamic method dispatch? [5+5]
- 6.a) Write a program to illustrate the use of multiple catch blocks for a try block. [5+5]
 - b) What are the uses of 'throw' and 'throws' clauses for exception handling? [5+5]
- OR**
- 7.a) What is the difference between a thread and a process? [5+5]
 - b) How to achieve synchronization among threads? Write suitable code. [5+5]

- 8.a) What is a vector? How does it differ from array, list?
b) Write a program to count number of words in a given sentence. [5+5]

OR

- 9.a) Write a program to copy the contents of file1 to file2. Read the names of files as command line arguments.
b) Write about driver manager class for database connectivity. [5+5]

- 10.a) Why swing components are preferred over AWT components?
b) What is an adapter class? What is their role in event handling? [5+5]

OR

- 11.a) Explain the life cycle of an applet.
b) What are the various layout managers used in Java? [5+5]

--ooOoo--

R13

Code No: 114AF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

DIGITAL DESIGN USING VERILOG HDL

(Electronics and Communication Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- | | | |
|------|--|-----|
| 1.a) | Explain about strobe tasks. | [2] |
| b) | Define logic levels relevant to verilog HDL. | [3] |
| c) | What is drive strength of a device or gate in verilog. | [2] |
| d) | Explain NOR gate primitive with example. | [3] |
| e) | Define fork-join block. | [2] |
| f) | Define force-release construct with an example. | [3] |
| g) | Design verilog module for 4-bit full adder using dataflow operators. | [2] |
| h) | What is recursive function | [3] |
| i) | Write a short note on design verification. | [2] |
| j) | Explain about implicit model. | [3] |

PART- B

(50 Marks)

- | | | |
|-----------|--|-------|
| 2.a) | Explain the synthesis procedure in verilog HDL. | |
| b) | Classify the data types and explain. | [5+5] |
| OR | | |
| 3.a) | Explain different levels of design description in verilog. | |
| b) | What are the functions of programming language interface (PLI)? Explain. | [5+5] |
| 4.a) | Write notes on tristate gates. Give the relevant syntax, logic diagrams and excitation tables. | |
| b) | Discuss about strings in detail. | [5+5] |
| OR | | |
| 5.a) | Explain continuous assignment structures with examples. | |
| b) | Write about net delay with an example. | [5+5] |
| 6.a) | Design verilog module to identify the highest priority interrupts. | |
| b) | Write test bench simulation results of above question with explanation. | [5+5] |
| OR | | |
| 7.a) | Write the differences between begin-end and fork-join blocks. | |
| b) | Explain about multiple always blocks. | [5+5] |

- 8.a) What do you mean by user defined primitive? Explain the types with examples. [5+5]
b) Explain briefly the module paths.

OR

- 9.a) Discuss the basic transistor switches. [5+5]
b) Explain the computer directives.

- 10.a) Write and explain the verilog module for positive edge trigger flip-flop. [5+5]
b) Discuss setup hold, width and period checks used in verilog.

OR

- 11.a) Explain cross coupled NOR latch. [5+5]
b) What are the various sequential memory storage models explain in detail.

--ooOoo--

Code No: 114DQ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

STRUCTURAL ANALYSIS - I

(Common to CE, CEE)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) What is the total degree of static indeterminacy of the truss shown in Figure 1. [2]

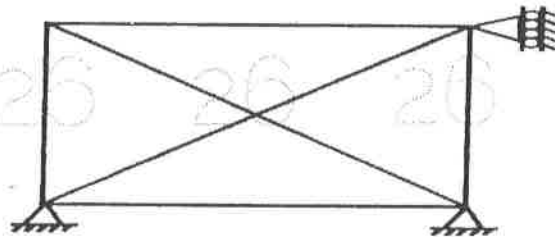


Figure 1

- b) State castiglino's First Theorem. [3]
 c) A three hinged parabolic arch hinged at the crown and springing has a horizontal span of 12 m and a central rise of 2.5 m. It carries a udl of 30 kN/m run over the left hand half of the span. Calculate the reactions at the end hinges. [2]
 d) Write the fixed end moments for a beam carrying a central clockwise moment for a span of "L". [3]
 e) Why is slope-deflection method called a 'displacement method'? [2]
 f) Find the deflection at the free end of a cantilever beam of span "L" carrying a point load of "W" at the free-end by strain energy method shown in figure 2. [3]

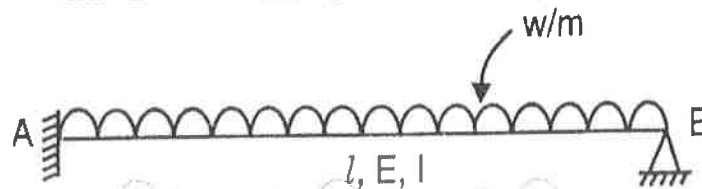


Figure 2

- g) In a member AB, if a moment of -10 kNm is applied at A, what is the moment carried over to B? [2]
 h) Explain 'carry over factor'. [3]
 i) A beam fixed at its left end simply supported at right. The right end sinks to a lower level by a distance 'Δ' with respect to the left end. Find the magnitude and direction of the reaction at the right end if l is the beam length and EI, the flexural rigidity. (Figure 3) [2]

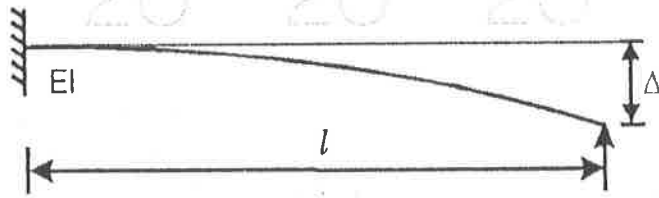


Figure 3

j) AB is a cantilever of span l , fixed at A. What is the carry over factor from B to A? (Figure 4). [3]



Figure 4

PART-B

(50 Marks)

2. Determine the forces in all the members of truss shown in Figure 5. [10]

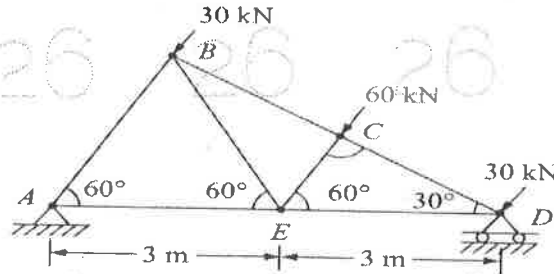


Figure 5

OR

3. Determine forces in all the members of the truss shown in Figure 6. [10]

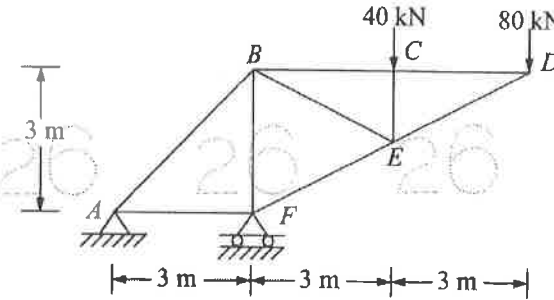


Figure 6

4. Determine the vertical deflection of point D in the truss shown in Figure 7. The cross-sectional areas of members AD and DE are 1500 mm^2 while those of the members are 1000 mm^2 . Take $E=200 \text{ kN/mm}^2$. [10]

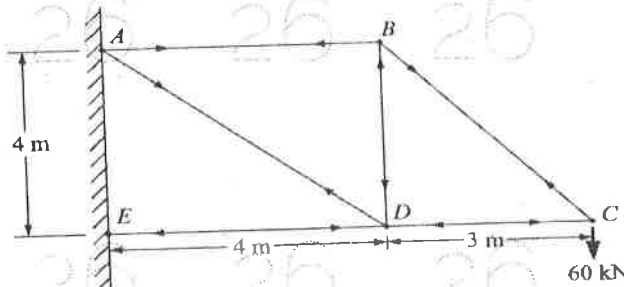


Figure 7
OR

5. A three-hinged symmetric circular arch has a span of 36 m and a rise of 6 m. Determine the bending moment, normal thrust and radial shear at 9 m from the left support, if the arch is subjected to a uniformly distributed load of intensity 30 kN/m over left half-portion and a concentrated load of 60 kN at 27 m from the left springing. [10]
6. For the propped cantilever shown in Figure 8, find the support reaction and plot the B.M. diagram. [10]

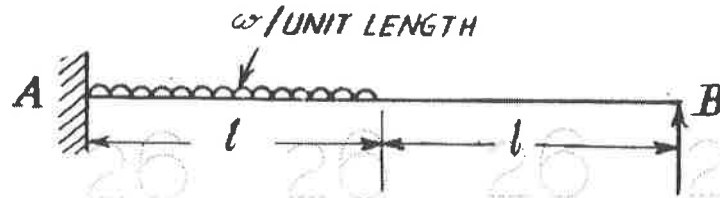


Figure 8
OR

7. Find the fixed end moments and plot the B.M. diagram for the beam loaded as shown in Figure 9. [10]

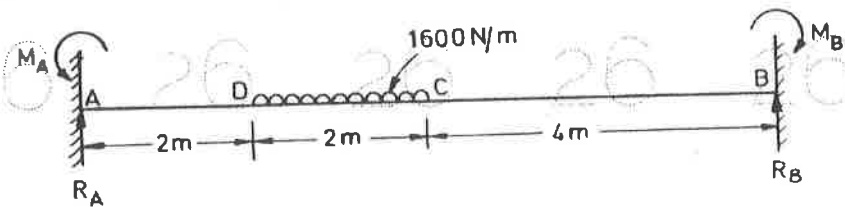


Figure 9

8. Analyse the continuous beam ABCD shown in Figure 10 by slope deflection method and draw bending moment diagram. [10]

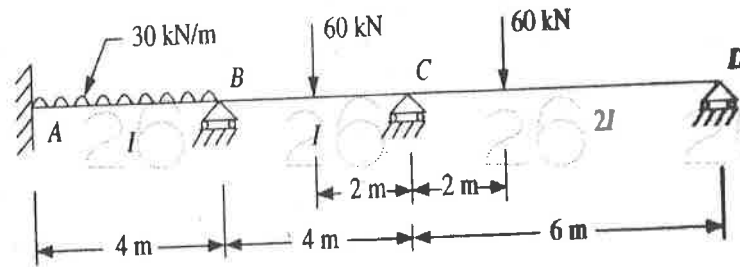


Figure 10

OR

9. Analyse the continuous beam shown in Figure 11 by moment distribution method, if support B sinks by 12 mm. given $E=200 \text{ kN/mm}^2$ and $I=20 \times 10^6 \text{ mm}^4$. [10]

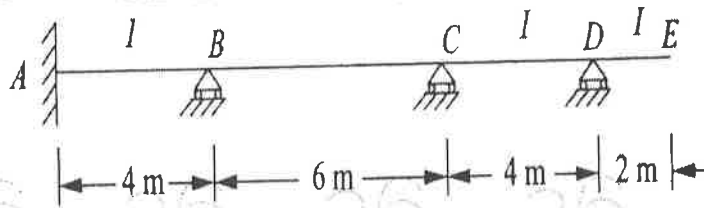


Figure 11

10. Two point loads of 6000 N and 3000 N spaced 4 m apart cross a girder of 10 m span from left to right, with smaller load leading. Construct the max. S.F. and B.M. diagrams. Find the position and amount of absolute maximum bending moment. [10]

OR

11. Determine the maximum bending moment which can occur when a train of loads of 4,000 N, 4,000 N, spaced 3 m apart cross a girder of 15 m span, the smaller load leading from left to right. Construct the maximum S.F. and B.M. diagrams, stating the position and amount of absolute maximum bending moment. [10]

--ooOoo--

R13

Code No: 114AD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

POWER SYSTEMS - I

(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART - A**(25 Marks)**

- 1.a) What is the need of Control rods in nuclear plants? [2]
- b) What is the function of economizer? [3]
- c) What are the design features of distribution systems? [2]
- d) How the distribution systems are classified? [3]
- e) What are the merits and demerits of main and transfer bus bar system? [2]
- f) What are the advantages and disadvantages of Air insulated substations? [3]
- g) What are the methods used for improving power factor? [2]
- h) What are the merits of on load tap changing transformer? [3]
- i) Define the integrated load duration curves. [2]
- j) What are the desirable characteristics of tariff? [3]

PART - B**(50 Marks)**

2. Write different components which are used for increasing the efficiency of a thermal power station. Explain them in detail. [10]

OR

- 3.a) Draw a neat line diagram of a nuclear power plant showing basic components. Discuss the merits of nuclear power plant compare to thermal power plants.
 - b) Explain with a neat diagram, the various parts of a nuclear reactor, mentioning clearly the function of each part. [5+5]
- 4.a) Compare underground and over head distribution systems.
 - b) If the resistance of a distributor (both return and ground) is 0.05 ohm/m and the distributed load in section 'DE' is 1 A/m, find the current distribution and minimum voltage in the distributor as shown in below figure 1, when
 - i) Both the ends are at same potential and
 - ii) Potential difference between the ends 'A' and 'B' is 4 Volts. [5+5]

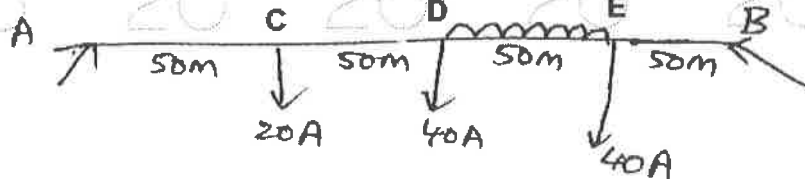


Figure 1

OR

5. A 3-phase distribution system is shown in below figure 2. Power is supplied at 'A' at a line voltage of 11kV and balance loads of 25A per phase at 0.8 p.f lag and 35A per phase at 0.9 p.f lag are taken at B and C. The impedance of the feeders are $Z_{AB} = (5+j9)\Omega$, $Z_{BC} = (6+j10)\Omega$ and $Z_{CA} = (4+j8)\Omega$. Calculate the voltages at B, C and D and the current in each branch. Load at mid point D of section BC is 10A at 0.9 p.f. Power factors are assumed with respect to voltage at 'A'. [10]

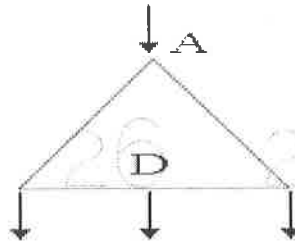


Figure 2

- 6.a) Make a list of the main equipment in a substation. Draw layout of a typical substation.
b) Explain the constructional aspects of gas insulated substations. [5+5]

OR

- 7.a) What is the difference between indoor and outdoor substations? What are the factors which are to be considered for a selection of a site of a substation?
b) Draw the single line diagram of a GIS. [5+5]

- 8.a) What are the sources for generation and absorption of reactive power in a given power system?
b) A synchronous motor having a power consumption of 40kW is connected in parallel with a load of 250 kW having a lagging p.f. of 0.85. If the combined load has a p.f of 0.95, what is the value of leading reactive kVA supplied by the motor and at what p.f is it working? [5+5]

OR

- 9.a) What are the various methods of voltage control? Explain the booster transformer for voltage control.
b) A single-phase motor connected to a 230 V, 50 Hz supply takes 25 A at a p.f of 0.8 lag. A capacitor is shunted across the motor terminals to improve the p.f to 0.95 lag. Determine the capacitance of the capacitor to be shunted across the motor terminals. [5+5]

10.a) Define and explain the following:

(i) Connected load (ii) Demand factor (iii) Diversity factor (iv) Plant use factor

b) A certain power station annual load duration curve is a straight line from 20 MW to 7MW. To meet this load, three turbine-generator units, two rated at 12 MW each and one rated at 8 MW are installed. Calculate the following

- i) Installed capacity
ii) Plant factor
iii) Units generated per annum
iv) Utilization factor [5+5]

OR

11.a) What are the costs of electrical energy? Explain.

b) The data of a power station as follows:

Installed capacity = 250 MW
Capital cost = Rs. 300×10^6
Rate of interest and depreciation = 15%
Annual cost of fuel oil, salaries and taxation = Rs. 40×10^6
Load factor = 0.7

Determine the cost of generation and cost of saving per kWh if the annual load factor is raised to 0.85. [5+5]

--ooOoo--

R09

Code No: 54003

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

HYDRAULICS AND HYDRAULIC MACHINES

(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Discuss the type and flows of open channel.
b) Calculate critical depth y_c and corresponding specific energy E_c for the following different shapes of channel when $Q = 8.5 \text{ m}^3/\text{s}$:
i) Rectangular channel $B = 2.5 \text{ m}$
ii) Triangular channel with side slope = 0.5 H: 1V, i.e., $z = 0.5$
iii) Trapezoidal channel with $B = 2.5$, side slope 1.5H:1V, $z = 1.5$. [7+8]

2. Integrate the differential equation of gradually varied flow for horizontal channel to get the profile equation as

$$x = \frac{y_c}{S_c} \left[\frac{\left(\frac{y}{y_c}\right)^{N-M+1}}{N-M+1} - \frac{\left(\frac{y}{y_c}\right)^{N+1}}{N+1} \right] + \text{constant}$$

Where S_c is the critical slope which gives uniform depth y_c N and M are hydraulic exponents for normal and critical depth computations. [15]

- 3.a) Discuss the importance of dimensional analysis in the context of fluid mechanics.
b) The variables involved for the motion of the floating vessel through water are the drag force F_D , the speed V , the length L , fluid density ρ , viscosity μ and acceleration due to gravity g . Using Buckingham's Π theorem, obtain an expression for the drag force. Explain the physical meaning of the dimensional groups. [7+8]

4. A jet of water having a velocity of 20 m/s impinges on a curved vane which is moving in the same direction as that of the jet with a velocity of 5 m/s. The jet makes an angle of 30° with the direction of motion of vane at outlet. If the water enters and leaves the vane without shock, find the vane angles at inlet and outlet. Also find the work done per second per unit weight of water striking the vane. [15]

5. Obtain an expression for the work done per unit time by water on the runner of a Pelton wheel. Also, obtain an expression for the maximum efficiency of the Pelton wheel giving the relationship between the jet speed and blocked speed. Draw inlet and outlet velocity triangles for a Pelton wheel and indicate the direction of various velocities. [15]

- 6.a) Obtain an expression for unit speed, unit discharge and unit power for a turbine.
b) A Francis turbine develops 10 MW under a head of 24 m and at a speed of 180 rpm and gives an efficiency of 82%. If a model 1/5th the size of the prototype is tested under a head of 4 m, what must be its speed, power and discharge to run under similar condition? [7+8]

7.a) Show by drawing suitable H-Q curves, how matching of pump and system characteristics is done for two centrifugal pumps operating in (i) series and (ii) parallel.

b) Define manometric efficiency of a centrifugal pump.

[8+7].

8.a) Classify hydropower plants along with neat sketches.

b) Explain load factor, utilization factor and capacity factor.

[7+8]

---ooOoo---

R09

Code No: 54012

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

ELECTRICAL MACHINES - II
(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Discuss the construction details of a single phase transformer. Mention how hysteresis and eddy current losses are minimized.
- b) Explain in detail the principle that flux in a transformer is always constant at all Loads, Draw the No-load phasor diagram. [8+7]
- 2.a) A 100 KVA lighting transformer has a full load loss of 3KW, the losses being equally divided between iron and copper. During the day, the transformer operates on full-load for 3 hours, three-fourth full load for 6 hours, the output being negligible for the remainder of the day. Calculate the all-day efficiency.
- b) Explain why transformer rating is expressed in KVA or VA. Describe the significance of all the items mentioned on the name - plate of a single - phase transformer. [7+8]
- 3.a) A 20 KVA, 2500/250 V, 50 Hz, 1-phase transformer has the following test results.
O.C. test (l.v. side) : 250 V, 1.4 A, 105 W
S.C. test (h.v. side) : 104 V, 8A, 320 W
Calculate the efficiency at full-load and 0.8 lagging power factor.
- b) Derive the equations for the current supplied by each transformer when two transformers are operating in parallel with equal voltage ratios. [8+7]
- 4.a) In a Scott connection, calculate the values of line currents on the three-phase side, if the loads on the 2-phase side are 300 KW and 450KW, both at 100V and 0.707 p.f. (lag) and the 3-phase line voltage is 3,300V. The 300KW load is on the leading phase on the 2-phase side. Neglect transformer losses.
- b) Discuss about off load and on load tap changing of a transformer. [8+7]
- 5.a) What are the different parts of a cage and slip-ring type induction motors? State the materials used for each part and also give reason for its use.
- b) Explain the principle of production of rotating magnetic field in a 3-phase induction motor. [8+7]
6. Estimate the starting torque as a percentage of full-load torque for a 3-phase Induction motor for the following methods of starting:
a) Direct on line, b) Star-Delta, and c) Autotransformer which limits the starting current to twice the full load current. The full load slip is 0.03 and the short-circuit current is six times the full-load current. [5+5+5]

- 7.a) Write down the necessary steps to construct the circle diagram.
b) Explain the concept of No load test on a Induction motor [8+7]
- 8.a) Briefly discuss the operation of induction machine as induction generator.
b) Compare various methods of speed control of 3-phase Induction Motor. [8+7]

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R09

Code No: 54015

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, December - 2017

APPLIED THERMODYNAMICS-I

(Common to ME, AME)

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

- 1.a) Discuss the effect of specific heat and composition of cylinder gases on the performance of an IC engine?
- b) The air fuel ratio of a diesel engines is 31:1. If the compression ratio is 15:1 and the temperature at the end of the compression is 1000 K, find at what percentage of stroke is the combustion complete, if the combustion begins at TDC and continuous at constant pressure. Calorific value of the fuel is 40000kJ/kg. Assume the variable specific heat, $C_p = a + bT$, where $a = 1$ and $b = 0.28 \times 10^{-4}$. [6+9]
- 2.a) With neat sketch describe different components of a Carburetor used in Spark Ignition Engines.
- b) Classify types of Lubrication Systems? Explain Pressure Feed lubrication systems with a neat sketch. [7+8]
- 3.a) Explain with neat sketch different stages of combustion in Spark Ignition engines.
- b) Discuss different types of combustion chambers used for SI Engines. [7+8]
- 4.a) Explain the effect of turbulence on combustion in CI engines.
- b) Describe in detail about important qualities of Compression Ignition Engine Fuels. [7+8]
5. The air flow to a four cylinder four stroke oil engine is measured by means of a 5 cm diameter orifice having a coefficient of discharge of 0.6. During a test on the engine, the following data were recorded; Bore = 10 cm, stroke = 12 cm, speed = 1200rpm, BP = 120N-m, fuel consumption = 5kg/hr, CV of fuel = 42MJ/kg, pressure drop across orifice is 4.6 cm of water, ambient temperature and pressure are 17°C and 1 bar respectively. Calculate (a) η_{bth} , (b) BMEP and (c) η_{vol} , based free air condition. [15]
6. A single stage, double acting air compressor delivers 15 m³ of free air per minute from 1 bar to 8 bar at 300 rpm. Assuming compression and expansion follow $PV^{1.3} = C$ and clearance is 1/16th of swept volume, find the diameter and the stroke of the compressor if L/D = 1.5. Take the temperature and the pressure at the suction as same as that of atmospheric air. [15]

7.a) Classify different types of positive displacement compressors? Explain with sketch rotary vane compressors.

b) A centrifugal delivers 580 m^3 of free air when running at 800 rpm. Using the following data:

Inlet pressure and temperature = 1.013 bar and 20°C

Compression ratio = 3.5

Isentropic efficiency = 83%

Flow velocity throughout the impeller = 62 m/ sec

Blade area coefficient = 0.94.

The blades are radial at the outlet of the impeller and Tip diameter = $2 \times$ eye diameter. Find,

(i) the IP required to run the compressor, (ii) impeller diameter at inlet and outlet and (iii) impeller blade angle at inlet. [6+9]

8. Air at 1 bar and 288K enters an axial flow compressor stage with an axial velocity of 150 m/s. There are no inlet guide vanes. The rotor has a tip diameter of 60 cm and a hub diameter of 50 cm and rotates at 100 rps. The air enters the rotor and leaves the stator with no change in velocity or radius. The air is turned through 30° as it passes through the rotor. Determine (a) the blade angles (b) mass flow rate (c) power required and (d) the degree of reaction. [15]

---ooOoo---

R09

Code No: 54055

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

FORMAL LANGUAGES AND AUTOMATA THEORY

(Computer Science and Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

1. Describe the following:
- a) DFA
 - b) NFA.
 - c) The notation such that an automaton produces output 'u' on input 'w'
 - d) The notation such that an automaton computes a function.
- [15]

- 2.a) Minimize the following DFA shown in figure 1.

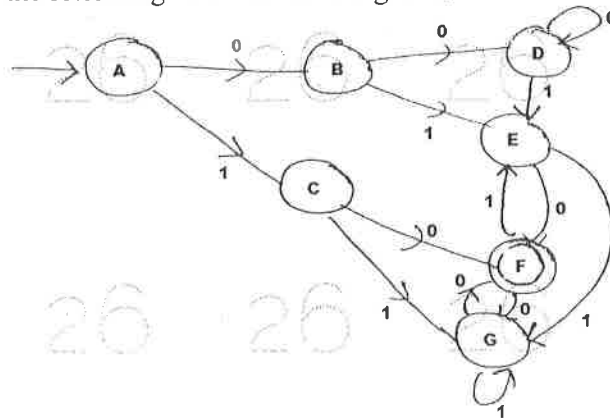


Figure: 1

- b) Convert the following NFA with ϵ -moves to DFA shown in figure 2. [8+7]

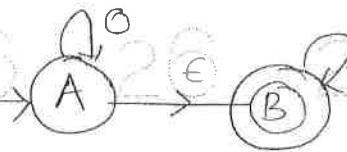


Figure: 2

- 3.a) Show that the following languages are not regular.
- i) $L = \{0^i 1^j \mid j = i \text{ or } j = 2i\}$
 - ii) $L = \{0^i 1^j \mid j \text{ is a multiple of } i\}$
- b) Discuss closure properties of regular sets. [8+7]

4. Define regular grammar? Construct a DFA to accept the language generated by the following grammar.

$S \rightarrow 01A, A \rightarrow 10B, B \rightarrow 0A / 11$

[15]

5.a) Convert the following grammar to Chomsky Normal Form

$S \rightarrow bA \mid aB$

$A \rightarrow bAA \mid as \mid a$

$B \rightarrow aBB \mid bS \mid b$

b) Eliminate ϵ -productions from 'G' is consisting of following production

$S \rightarrow ABA$

$A \rightarrow aA \mid \epsilon$

$B \rightarrow bB \mid \epsilon$ and simplify the grammar.

[8+7]

6. Design PDA for the language $L = \{a^n b^{n+m} c^m \mid n, m \geq 1\}$.

[15]

7. Design Turing Machine which recognizes the words of the form

$L = \{0^n 1^n \mid n \geq 1\}$

[15]

8.a) What is meant by Chomsky hierarchy of languages? Explain the relations between different types of languages.

b) What is Post Correspondence Problem? Explain.

[8+7]

R09

Code No: 54011

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

Note: Requires supply of "Smith chart".

- 1.a) What do you mean by Electric Field Intensity, obtain the relation for Electric Field Intensity due to an infinite line charge?
- b) A uniform line charge $\rho_L = 25\text{nC/m}$ lies on the line $x = 3$ and $z = 4$ in free space. Find the expression for E in Cartesian coordinates at the origin. [8+7]
- 2.a) Derive an expression for Ohms law in point form.
- b) Derive Poisson's and Laplace's equations starting from Gauss law. [7+8]
- 3.a) State and explain Biot-Savart's law.
- b) Derive the expression for magnetic field intensity, H due to a finite and infinite straight filimentary conductor carrying a current 'I'. [7+8]
- 4.a) State and explain Faraday's Laws of Electromagnetic Induction.
- b) Derive the boundary conditions at the dielectric – dielectric interface. [7+8]
- 5.a) Find the all relations between E and H in a Uniform Plane Wave. Find the value of intrinsic impedance in free space.
- b) Let $\mu = 3 \times 10^{-5}$ H/m, $\epsilon = 1.2 \times 10^{-10}$ F/m and $\sigma = 0$ everywhere. If $H = 2\cos(10^{10}t - \beta x)a_z$ A/m. Use Maxwell's equation to find β . [8+7]
- 6.a) Discuss the significance of the pointing theorem and derive the equation for pointing vector.
- b) A uniform plane wave incident normally on an infinitely thick slab of a material with 25 V/m Electric field. A material has a Dielectric constant 4. How much power penetrates the material slab? [7+8]
- 7.a) What is loading? Explain different types of loading in transmission lines.
- b) A transmission line with air as dielectric has $Z_0 = 50$ ohm and phase constant of 3.0 rad/m at 10MHz. Find the inductance and capacitance of the line. [7+8]
- 8.a) State and explain the relation between VSWR and Reflection Coefficient.
- b) A load of $100 + j180$ is connected to a 75Ω lossless line. Find γ , S and Z_{in} at the generator using the smith chart. [7+8]

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R07

Code No: V0221

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, December - 2017

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 80

Answer any five questions
All questions carry equal marks

- 1.a) Define Managerial Economics and explain the scope of Managerial Economics.
b) What is demand? And explain the law of demand and its exceptions. [8+8]
- 2.a) What is elasticity of demand? Explain its classification.
b) Explain the importance of demand forecasting and describe the factors governing demand forecasting. [8+8]
- 3.a) Define production function and explain the salient features of Cobb- Douglas Production function.
b) What is opportunity cost? And explain Explicit and Implicit cost with suitable examples. [8+8]
- 4.a) Explain the salient features of perfect competition and monopoly.
b) Describe the objectives of pricing and explain any two methods of pricing. [8+8]
- 5.a) Define business and explain the salient features of Sole Proprietorship and Partnership.
b) Explain the salient features of Joint Stock Company and advantages and disadvantages private and public limited companies. [8+8]
- 6.a) Explain the significance of capital and briefly outline the methods and sources of raising finance.
b) Determine the Accounting Rate of Return from the following data of two machines A and B.

	Machine A	Machine B
Cost	Rs.56,125	56,125
Annual estimated income after depreciation and income tax		
Year 1	3,375	11,375
Year 2	5,375	9,375
Year 3	7,375	7,375
Year 4	9,375	5,375
Year 5	11,375	3,375
	36,875	36,875
Estimated life (years)	5	5
Estimated salvage value	3,000	3,000

Depreciation has been charged on straight -line basis.

[8+8]

- 7.a) Explain the importance of financial accounting and describe the significance of double- entry Book- Keeping.
- b) Prepare Manufacturing Trading and Profit and Loss Account from the following figure relating for the year 1998

Stock	01-01-1998 (Rs.)	31-12-1998 (Rs.)
Finished Goods	33,000	27,500
Raw materials	16,000	18,300
Work-in -Progress	11,100	9,400
Purchase of Materials		1,50,900
Carriage on Purchases		4,100
Wages		65,000
Factory Salaries		26,000
Office Salaries		18,000
Repair and Maintenance		
Machinery		8,300
Office Equipment		1,700
Depreciation		
Machinery		25,000
Office Equipment		8,100
Sundry Expenses		
Factory		5,300
Office		17,800
Sales		3,60,000

It is the firm's practice to transfer goods from the factory to sales go down at cost plus 10%. [6+10]

- 8.a) Explain the importance of ratio analysis and its classification.
- b) Calculate the Debtors Turnover Ratio from the following figures: [6+10]

Total Sales for the year 1998	1,00,000
Cash Sales for the year 1998	20,000
Debtors as on 1-01-1998	10,000
Debtors as on 31-12-1998	15,000
Bills Receivable as on 01-01-1998	7,500
Bills Receivable as on 31-12-1998	12,500

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R15

Code No: 224AD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Pharmacy II Year II Semester Examinations, December-2017

PHYSICAL PHARMACY-II

Time: 3hours

Max.Marks:75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Define surface area. [2]
- b) Give examples for flocculating agent. [3]
- c) Define surface tension. [2]
- d) What is yield value and in which type of system it is observed? [3]
- e) Define micromeritics. [2]
- f) Classify derived properties of powder. [3]
- g) Define kinematic viscosity. [2]
- h) What is negative thixotropy? [3]
- i) Define zeta potential and how it is different from Nernst potential. [2]
- j) What is the porosity when solid particles are packed closely? [3]

PART-B

(50 Marks)

- 2.a) Derive first order reaction and write influence of temperature.
 - b) What is oxidation? Explain how you will control it by briefing its mechanism. [10]
- OR**
- 3.a) Explain the objective and procedure of shelf life.
 - b) Explain briefly on decomposition mechanisms and stabilization of pharmaceutical products. [10]
- 4.a) Write a note on the interfacial properties of suspended particles in suspension.
 - b) What is the difference between surface and interfacial tension? [10]
- OR**
- 5.a) Discuss the concept of Donnan Membrane equilibrium.
 - b) Explain the method for determining spreading coefficient. [10]
- 6.a) Enumerate the derived properties of powders. How are they evaluated?
 - b) What is an adsorption isotherm? Draw various adsorption isotherms and explain their behavior. [10]
- OR**
- 7.a) Explain the difference between bulk density and true density.
 - b) How the bulk density and true density is applied to design a dosage form? [10]

- 8.a) Explain the different concepts of flow behavior.
b) Write the application of rheology in pharmaceutical formulations. [10]

OR

- 9.a) Differentiate between Newtonian and Non-Newtonian flow.
b) Explain why bulges and spurs are observed in rheogram of certain samples. [10]

- 10.a) What are dispersed systems? Discuss the approaches that can be used for formulating flocculated suspension.
b) Briefly explain the test to assess the stability of the suspensions. [10]

OR

- 11.a) Differentiate between primary and auxillary emulsifiers. Classify them and give suitable examples.
b) Explain in detail preparation and stability of emulsions. [10]

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R15

Code No: 124CV

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

ELECTRONIC CIRCUIT ANALYSIS

(Common to ECE, EIE, ETM)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Draw a small signal low frequency model of a transistor. [2]
- b) State dual of Miller's theorem and also write its applications. [3]
- c) What is unity crossover frequency? [2]
- d) Define a short circuit gain of a transistor in CE configuration at high frequencies. [3]
- e) What is effect of negative feedback on amplifier gain? [2]
- f) State Barkhausen criterion of oscillator. [3]
- g) Why heat sinks are needed? [2]
- h) What is mean by crossover distortion? [3]
- i) Define Q factor of tuned amplifier. [2]
- j) What are the limitations of Single tuned amplifier? [3]

PART-B

(50 Marks)

- 2.a) The h parameters of a transistor used in single stage amplifier circuit are $h_{ic} = 1100$, $h_{rc} = 1$, $h_{fc} = 51$ and $h_{oc} = 25\mu A$. Determine the amplifier parameters for CC configuration when $R_S = R_L = 10K$.
 - b) For any single-stage amplifier express input resistance in terms of current gain and h-parameters only. [5+5]
- OR**
- 3.a) Derive the bandwidth of a multistage amplifier, assuming that each stage has same upper and lower cut off frequencies.
 - b) For the two stage amplifier of the figure 1, calculate the input and output impedance, and the individual and overall voltage gains. Assume $h_{fc} = 50$, $h_{ic} = 1.1k\Omega$, $h_{re} = h_{oe} = 0$. [5+5]

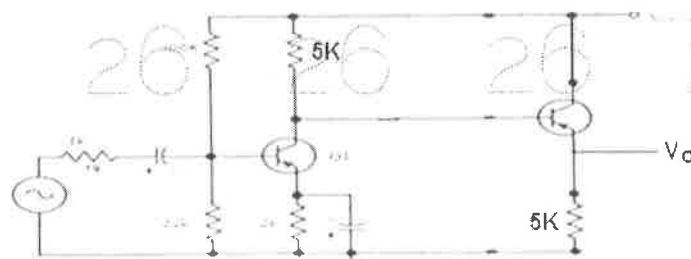


Figure: 1

- 4.a) A transistor biased at 20mA, 20V, it has the h-parameters at room temperature $h_{ie} = 500\Omega$, $h_{fe} = 100$, $h_{re} = 10^{-4}$, $h_{oe} = 4 \times 10^{-5}\text{S}$. It has $f_T = 50\text{MHz}$ and $C_C = 3\text{pF}$. Find all the values of hybrid π components.
- b) The 3-dB bandwidth of an amplifier extends from 20 Hz to 20 kHz. Find the frequency range over which the voltage gain differs by only 1 dB from the mid band value. [5+5]

OR

- 5.a) The amplifier of figure 2 uses a FET with $I_{DSS} = 3\text{mA}$, $V_p = -3\text{V}$, $r_d \gg R_d$. Find the quiescent drain current, quiescent drain to source voltage and A_V .

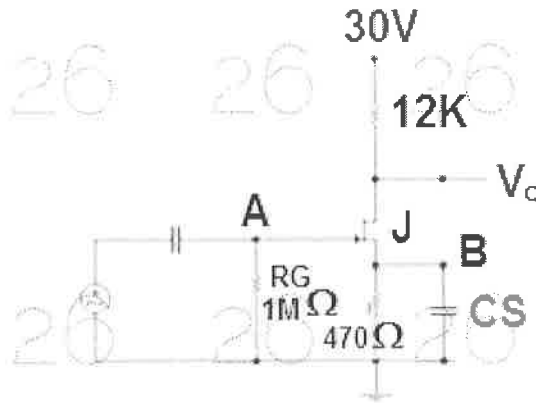


Figure: 2

- b) Derive the equation for voltage gain of a CS FET amplifier. [5+5]
- 6.a) An amplifier has an open loop voltage gain of 1000 and delivers 10W output with 10% second harmonic distortion when the input is 10mV. Find the distortion of 60dB of negative feedback is applied.
- b) Calculate $A_{vf} = V_o/V_s$, R_{if} and R_{of} for the circuit shown in figure 3 use typical h parameter values. $R_s = R_C = 10\text{K}$ and $R_e = 1\text{K}$. [5+5]

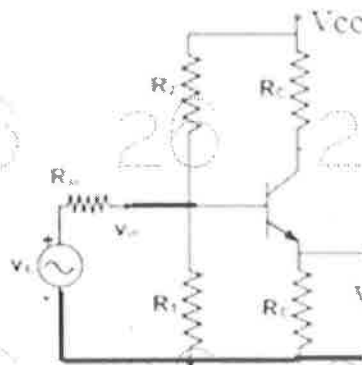


Figure: 3

OR

- 7.a) Derive an expression for frequency of oscillations of a RC phase shift oscillator using transistor.
- b) A colpitts oscillator is designed with $C_1 = 100\text{pF}$ and $C_2 = 7500\text{pF}$. Find the range of inductance values if the frequency of oscillations vary between 950 and 2050KHz. [5+5]

8.a) Classify amplifiers based on operating point selection. Compare them in terms of efficiency and distortion.

b) A transformer coupled class A large signal amplifier has maximum and minimum values of collector-to-emitter voltage of 25V and 2.5V. Determine its collector efficiency. [5+5]

OR

9.a) What is push pull configuration and how does this circuit reduce the harmonic distortion?

b) Given an ideal class B Push Pull amplifier whose collector supply voltage is V_{cc} , and $R_L' = n^2 R_L$ are fixed as base current excitation is varied, show that the collector dissipation P_c is zero at no signal, rises as V_m increases and passes through a maximum at $V_m = 2V_{cc}/\pi$. [5+5]

10. Draw the circuit diagram of double tuned amplifier and explain its working and derive the equation for bandwidth. [10]

OR

11.a) How to reduce the instability in tuned amplifier? Explain them with neat circuit diagram.

b) What are the advantages of stagger tuned amplifier? Draw its frequency response. [5+5]

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R15

Code No: 124DM

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

PRODUCTION TECHNOLOGY
(Common to ME, MCT, AME, MSNT)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) What materials are used for moulding sand? [2]
- b) What is pressurized gating ratio? [3]
- c) What is the difference in design of torch tips in gas welding and gas cutting? [2]
- d) Mild steel can be welded by which flame of oxy-acetylene welding and why? [3]
- e) What are the different ways by which the metal is transferred in gas metal arc welding? [2]
- f) What are the advantages of laser beam welding? [3]
- g) What is strain hardening? [2]
- h) Explain the coining and embossing operations. [3]
- i) What is fullering operation? [2]
- j) Differentiate drop and press forging. [3]

PART-B

(50 Marks)

- 2.a) What are the types of gates used in the casting process?
 - b) What are the advantages of centrifugal casting as compared to other conventional methods of casting? [5+5]
- OR**
- 3.a) How chills and pads help in directional solidification?
 - b) What process is followed in shell moulding process? [3+7]
- 4.a) Differentiate DCRP and DCSP.
 - b) What purpose is served by coatings on the electrode during welding operation and what are the coating materials used? [5+5]
- OR**
- 5.a) Explain forge welding operation and its limitations.
 - b) How the heat energy is used in thermit welding process? [3+7]

- 6.a) Discuss any one non destructive testing of welds.
b) Distinguish soldering and brazing process and also state its applications. [5+5]

OR

- 7.a) Explain induction welding operation.
b) Explain diffusion welding operation with its applications. [3+7]

- 8.a) What are the various roll pass sequences?
b) Explain the sequences used in wire and tube drawing operations. [5+5]

OR

- 9.a) Differentiate hot and cold spinning.
b) Discuss the mechanics used in finding the angle of bite of the rolling operation. [3+7]

10. What are the various stages encountered in drop forging of lever. [10]

OR

- 11.a) What is impact extrusion?
b) Distinguish the forward and backward extrusion process. [3+7]

---ooOoo---

R15

Code No: 124AG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

FORMAL LANGUAGES AND AUTOMATA THEORY

(Computer Science and Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) Define Transition diagram. [2]
- b) Explain about ϵ -closure(). [3]
- c) Write a short note on Derivation Tree. [2]
- d) Explain Rightmost Derivation with an example. [3]
- e) Define Chomsky Normal Form. [2]
- f) Design Push Down Automata for $L = \{a^{2n}b^n \mid n \geq 1\}$. [3]
- g) Write a short note on Church's hypothesis. [2]
- h) Write a short note on Recursively Enumerable languages. [3]
- i) Write about decidability of problems. [2]
- j) Define NP-complete problems. [3]

PART-B**(50 Marks)**

- 2.a) Convert the Moore machine to determine residue mod 3 into Mealy machine.
- b) Construct the minimum state automata for the following. [5+5]

	0	1
$\rightarrow A$	B	C
B	B	C
C	B	C
D	B	E
\textcircled{E}	B	C

OR

- 3.a) Convert the following NFA with ϵ to equivalent DFA:

	a	b	ϵ
$\rightarrow P$	Φ	P	Q
Q	Q	Φ	R
\textcircled{R}	Q	P	Φ

- b) Design NFA accepting string with a's and b's such that string containing two consecutive a's or two consecutive b's. [5+5]

4.a) For the following grammar give the leftmost and rightmost derivation for the string '00101'.

$S \rightarrow A1B$
 $A \rightarrow 0A / \epsilon$
 $B \rightarrow 0B / 1B / \epsilon$

b) Prove that the following language $\{a^n b^n \mid n \geq 1\}$ is not a regular. [5+5]

OR

5.a) Write a R.E. for the following DFA:

	a	b
$\rightarrow P$	Q	P
Q	Q	P

b) Construct the right linear grammar for the language $(0+1)^*00(0+1)^*$. [5+5]

6.a) Convert the following grammar to Greibach Normal Form

$S \rightarrow ABA \mid AB \mid BA \mid AA \mid B$
 $A \rightarrow aA \mid a$
 $B \rightarrow bB \mid b$

b) Convert the following Context Free Grammar into Chomsky Normal Form
 $S \rightarrow aaaaS \mid aaaa$ [5+5]

OR

7.a) Reduce the following grammar such that there are no UNIT productions

$S \rightarrow AA$
 $A \rightarrow B \mid BB$
 $B \rightarrow abB \mid b \mid bb$

b) Construct CFG for the PDAM = $(\{q_0, q_1\}, \{0, 1\}, \{R, Z_0\}, \delta, q_0, Z_0, \Phi)$ and δ is given by

$\delta(q_0, 1, Z_0) = (q_0, RZ_0)$
 $\delta(q_0, 1, R) = (q_0, RR)$
 $\delta(q_0, 0, R) = (q_1, R)$
 $\delta(q_1, 0, Z_0) = (q_0, Z_0)$
 $\delta(q_0, \epsilon, Z_0) = (q_0, \epsilon)$
 $\delta(q_1, 1, R) = (q_1, \epsilon)$

[5+5]

8.a) Design a TM to recognize the language $L = \{0^n 1^n 0^n \mid n \geq 1\}$.

b) Design TM which will recognize strings containing equal number of a's and b's. [5+5]

OR

9.a) Design a TM to accept the language $L = \{w c w^R \mid w \in (a+b)^*\}$.

b) Design a TM to recognize all strings consisting of odd number of 1's. [5+5]

10.a) Give the closure properties of deterministic context free languages.

b) What are undecidable problems? Give example. [5+5]

OR

11.a) Give definitions of P and NP problems.

b) Explain TM halting problem. [5+5]

R15

Code No: 124DT

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

SWITCHING THEORY AND LOGIC DESIGN

(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART-A**(25 Marks)**

- 1.a) What is ASCII code? [2]
- b) How do you obtain dual of an expression? [3]
- c) What are don't cares? [2]
- d) What is minterm? [3]
- e) Why subtractor ICs not available? [2]
- f) Compare a Latch and flip-flop. [3]
- g) What are the basic types of shift registers? [2]
- h) What are the advantages of synchronous counters? [3]
- i) Explain capabilities of finite state machine. [2]
- j) Explain concept of minimal cover table. [3]

PART-B**(50 Marks)**

- 2.a) Convert 105.15_{10} to binary, octal and hexadecimal.
- b) What is hamming code? How is the hamming code word tested and corrected? [5+5]

OR

- 3.a) Simplify the following Boolean expressions using the Boolean theorems.
(i) $(ABC) + (B'C) + (AD) + (A'C)$ (ii) $(AB) + (AB') + (A'B)$
- b) Realize XNOR gates using only NAND gates. [5+5]
- 4.a) Simplify $Y = \sum m(3,6,7,8,10,12,14,17,19,20,21,24,25,27,28)$ using K-map method.
- b) Obtain i) minimal SOP and ii) minimal POS expressions for the following function $F(A,B,C,D) = \sum m(0,1,5,8,9,10)$. [5+5]

OR

5. Obtain the minimal SOP expression for the switching function using k-map.
 $Y = \sum m(1,5,7,13,14,15,17,18,21,22,25,29) + \sum d(6,9,19,23,30)$
Draw and explain the logic diagram. [10]

6. What is meant by 'edge triggered'? Differentiate SR-FF and JK-FF with their functional operation and excitation tables. [10]

OR

7. Draw and explain the circuit diagram of positive edge triggered J-K flip-flop using NOR gates with its truth table. How race around conditions are eliminated? [10]

8. Discuss about synchronous and ripple counters. Compare their merits and demerits. [10]

OR

9. What do you mean by universal shift register? Draw and explain its circuit diagram and operation. [10]

10.a) What are the Moore and Melay machines? Compare them.

b) Explain the procedure for state minimization using the partition technique. [5+5]

OR

11.a) Name the elements of an ASM chart and define each one of them.

b) Explain the control subsystem implementation of weighing machine. [5+5]

---ooOoo---

R13

Code No: 114CV

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

ELECTRONIC CIRCUIT ANALYSIS

(Common to ECE, EIE)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- Draw a small signal low frequency model of a transistor. [2]
- State dual of Miller's theorem and also write its applications. [3]
- What is unity crossover frequency? [2]
- Define a short circuit gain of a transistor in CE configuration at high frequencies. [3]
- What is effect of negative feedback on amplifier gain? [2]
- State Barkhausen criterion of oscillator. [3]
- Why heat sinks are needed? [2]
- What is mean by crossover distortion? [3]
- Define Q factor of tuned amplifier. [2]
- What are the limitations of Single tuned amplifier? [3]

PART-B

(50 Marks)

- The h parameters of a transistor used in single stage amplifier circuit are $h_{ie} = 1100$, $h_{re} = 1$, $h_{fe} = 51$ and $h_{oe} = 25\mu A$. Determine the amplifier parameters for CC configuration when $R_S = R_L = 10K$.
 - For any single-stage amplifier express input resistance in terms of current gain and h-parameters only. [5+5]
- OR**
- Derive the bandwidth of a multistage amplifier, assuming that each stage has same upper and lower cut off frequencies.
 - For the two stage amplifier of the figure 1, calculate the input and output impedance, and the individual and overall voltage gains. Assume $h_{fe} = 50$, $h_{ie} = 1.1k\Omega$, $h_{re} = h_{oe} = 0$. [5+5]

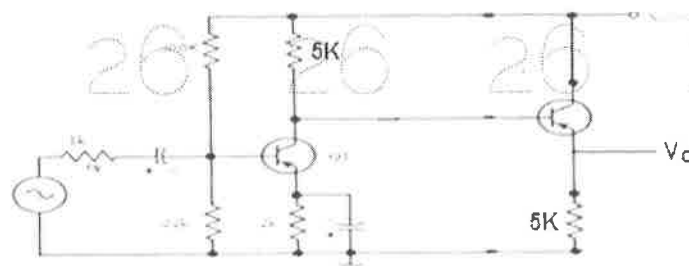


Figure: 1

- 4.a) A transistor biased at 20mA, 20V, it has the h-parameters at room temperature $h_{ie} = 500\Omega$, $h_{fe} = 100$, $h_{re} = 10^{-4}$, $h_{oe} = 4 \times 10^{-5}\Omega$. It has $f_T = 50\text{MHz}$ and $C_C = 3\text{pF}$. Find all the values of hybrid π components.
- b) The 3-db bandwidth of an amplifier extends from 20 Hz to 20 kHz. Find the frequency range over which the voltage gain differs by only 1 dB from the mid band value. [5+5]

OR

- 5.a) The amplifier of figure 2 uses a FET with $I_{DSS} = 3\text{mA}$, $V_p = -3\text{V}$, $r_d \gg R_d$. Find the quiescent drain current, quiescent drain to source voltage and A_V .

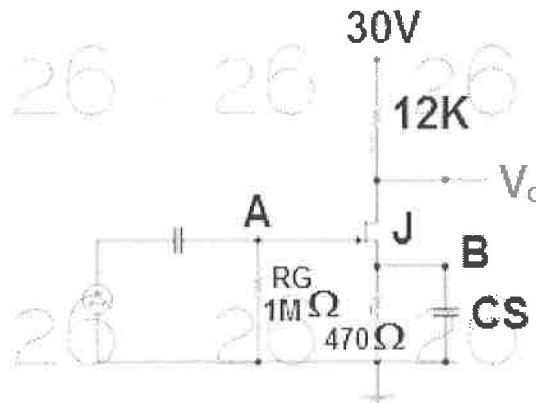


Figure: 2

- b) Derive the equation for voltage gain of a CS FET amplifier. [5+5]
- 6.a) An amplifier has an open loop voltage gain of 1000 and delivers 10W output with 10% second harmonic distortion when the input is 10mV. Find the distortion of 60dB of negative feedback is applied.
- b) Calculate $A_{vf} = V_0/V_s$, R_{if} and R_{of} for the circuit shown in figure 3 use typical h parameter values. $R_s = R_C = 10\text{K}$ and $R_e = 1\text{K}$. [5+5]

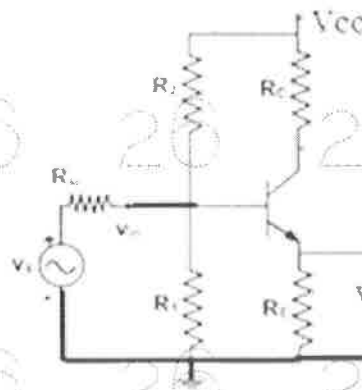


Figure: 3

OR

- 7.a) Derive an expression for frequency of oscillations of a RC phase shift oscillator using transistor.
- b) A colpitts oscillator is designed with $C_1 = 100\text{pF}$ and $C_2 = 7500\text{pF}$. Find the range of inductance values if the frequency of oscillations vary between 950 and 2050KHz. [5+5]

- 8.a) Classify amplifiers based on operating point selection. Compare them in terms of efficiency and distortion.
- b) A transformer coupled class A large signal amplifier has maximum and minimum values of collector-to-emitter voltage of 25V and 2.5V. Determine its collector efficiency. [5+5]

OR

- 9.a) What is push pull configuration and how does this circuit reduce the harmonic distortion?
- b) Given an ideal class B Push Pull amplifier whose collector supply voltage is V_{cc} , and $R_L' = n^2 R_L$ are fixed as base current excitation is varied, show that the collector dissipation P_c is zero at no signal, rises as V_m increases and passes through a maximum at $V_m = 2V_{cc}/\pi$. [5+5]
10. Draw the circuit diagram of double tuned amplifier and explain its working and derive the equation for bandwidth. [10]

OR

- 11.a) How to reduce the instability in tuned amplifier? Explain them with neat circuit diagram.
- b) What are the advantages of stagger tuned amplifier? Draw its frequency response. [5+5]

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R13

Code No: 114DP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

STRENGTH OF MATERIALS – II

(Common to CE, CEE)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

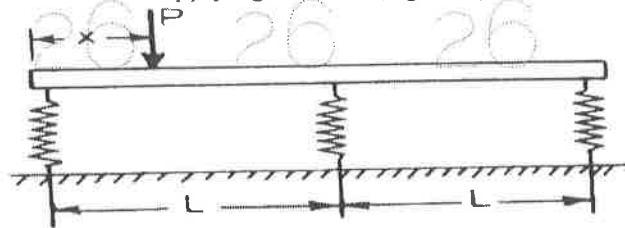
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) Draw the torsional shear stress distribution in a solid and in a hollow shaft. [2]
- b) State the difference between torsional failure surfaces in ductile and brittle materials. [3]
- c) Write the differential equation for beam column. [2]
- d) Define slenderness ratio. [3]
- e) State the secant column formula. In which situation is this formula used? [2]
- f) Define section modulus. [3]
- g) Define Shear centre. [2]
- h) Define hoop stress. [3]
- i) In which applications are thick-walled cylinders involved? [2]
- j) A thin spherical vessel 100 mm diameter and 12.5 mm thick is filled with water. More water is pumped in until the pressure reaches 4.2 MPa. How much extra water was required to reach this pressure. Assume $E=210$ GPa, $\gamma=0.25$. [3]

PART-B**(50 Marks)**

2. A hollow steel shaft 3 m long must transmit a torque of 25 kN m. The total angle of twist in this length is not to exceed 2.5° and the allowable shearing stress is 90 MPa. Determine the inside and outside diameter of the shaft if $G=85$ GPa. [10]
- OR**
3. A stiff bar of negligible weight transmits a load P to a combination of 3 springs. The three springs are made of the same material and out of rods of equal diameters. They are of the same length before loading. The number of coils in the three springs are 10, 12 and 15 respectively, while the mean radii of the coils are in the proportion 1:1.2:1.4 respectively. Find the distance x such that the stiff bar remains horizontal after applying the load (figure 1). [10]

**Figure: 1**

4. A bar of length L clamped at its lower end and subject to both vertical and horizontal forces at the upper end, as shown in Figure 2. The vertical force P is equal to one-fourth of the Euler load for this bar. Determine the lateral displacement of the upper end of the bar. [10]

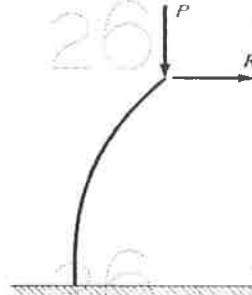


Figure: 2

OR

5. Determine the horizontal and vertical deflections of the end B of the thin curved beam shown in Figure 3. $E=200 \text{ GN/m}^2$, width = 10 mm, thickness = 5 mm, $P=2 \text{ N}$. [10]

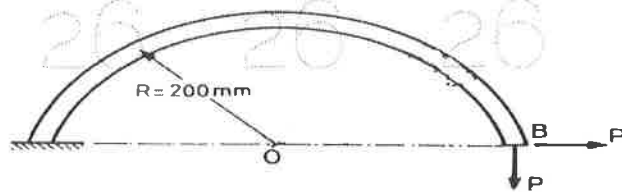


Figure: 3

6. A simply supported beam column of $4 \text{ cm} \times 6 \text{ cm}$ cross-section 1.5 m long is subjected to an axial load of 8 kN in addition to a transverse concentrate load of 15 kN at a distance of 50 cm from one end. Determine the maximum deflection and the maximum stress in the column. $E=200 \text{ GPa}$. [10]

OR

7. A masonry dam 9 m high and trapezoidal in section has the top width 1 m and the bottom width 5 m. The face exposed to water is inclined at a slope of 1:10. Test the stability of the dam if the coefficient of friction is 0.6. Density of dam material 2500 kg/m^3 and that of water 1000 kg/m^3 (figure 4). [10]

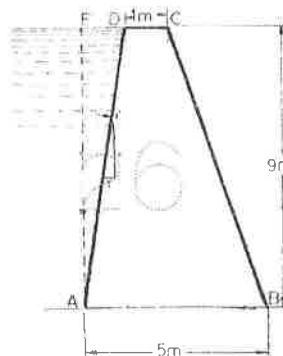


Figure: 4

8. Determine the shear center of the thin walled section indicated in Figure 5. The thickness t is constant. [10]

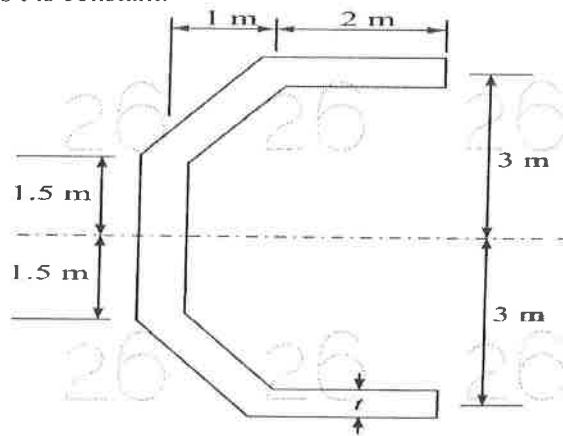


Figure: 5
OR

9. Calculate the stresses at points A, B and C of the cross-section of the beam shown in Figure 6. [10]

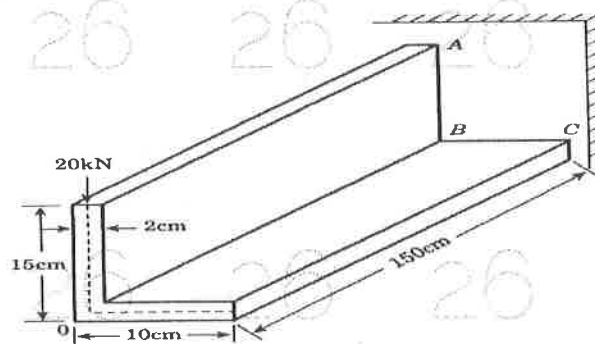


Figure: 6

10. A cylindrical shell 2.5 m long and closed at the ends has an internal diameter of 1.25 m and wall thickness of 20 mm. Calculate the change in dimensions when subjected to an internal pressure of 1.5 MPa. Take $E=200$ GPa, $\nu=0.3$. [10]

OR

- 11.a) Prove that the maximum hoop stress in a thick cylinder is given by

$$(\sigma_{\theta})_{\max} = p \left(\frac{k^2 + 1}{k^2 - 1} \right)$$

Where

P = internal pressure

K = outside to inside diameter ratio.

- b) If a cylinder of internal diameter d , wall thickness t and subjected to internal pressure only, is assumed to be a thin cylinder, what is the greatest value for the ratio t / d if the error in the estimated maximum hoop stress is not to exceed 5 percent? [5+5]

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R13

Code No: 114DT

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

SWITCHING THEORY AND LOGIC DESIGN

(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

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Part A is compulsory which carries 25 marks. Answer all questions in Part A.

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PART- A**(25 Marks)**

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- b) How do you obtain dual of an expression? [3]
- c) What are don't cares? [2]
- d) What is minterm? [3]
- e) Why subtractor ICs not available? [2]
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- g) What are the basic types of shift registers? [2]
- h) What are the advantages of synchronous counters? [3]
- i) Explain capabilities of finite state machine. [2]
- j) Explain concept of minimal cover table. [3]

PART-B**(50 Marks)**

- 2.a) Convert 105.15_{10} to binary, octal and hexadecimal.
- b) What is hamming code? How is the hamming code word tested and corrected? [5+5]

OR

- 3.a) Simplify the following Boolean expressions using the Boolean theorems.
(i) $(ABC) + (B'C) + (AD) + (A'C)$ (ii) $(AB) + (AB') + (A'B)$
- b) Realize XNOR gates using only NAND gates. [5+5]
- 4.a) Simplify $Y = \sum m(3,6,7,8,10,12,14,17,19,20,21,24,25,27,28)$ using K-map method.
- b) Obtain i) minimal SOP and ii) minimal POS expressions for the following function $F(A,B,C,D) = \sum m(0,1,5,8,9,10)$. [5+5]

OR

5. Obtain the minimal SOP expression for the switching function using k-map.
 $Y = \sum m(1,5,7,13,14,15,17,18,21,22,25,29) + \sum d(6,9,19,23,30)$
Draw and explain the logic diagram. [10]

6. What is meant by 'edge triggered'? Differentiate SR-FF and JK-FF with their functional operation and excitation tables. [10]

OR

7. Draw and explain the circuit diagram of positive edge triggered J-K flip-flop using NOR gates with its truth table. How race around conditions are eliminated? [10]

8. Discuss about synchronous and ripple counters. Compare their merits and demerits. [10]

OR

9. What do you mean by universal shift register? Draw and explain its circuit diagram and operation. [10]

10.a) What are the Moore and Melay machines? Compare them.

b) Explain the procedure for state minimization using the partition technique. [5+5]

OR

11.a) Name the elements of an ASM chart and define each one of them.

b) Explain the control subsystem implementation of weighing machine. [5+5]

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Code No: 114AG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

FORMAL LANGUAGES AND AUTOMATA THEORY

(Computer Science and Engineering)

Time: 3 Hours

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PART- A**(25 Marks)**

- 1.a) Define Transition diagram. [2]
- b) Explain about ϵ -closure(). [3]
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- d) Explain Rightmost Derivation with an example. [3]
- e) Define Chomsky Normal Form. [2]
- f) Design Push Down Automata for $L = \{a^{2n}b^n \mid n \geq 1\}$. [3]
- g) Write a short note on Church's hypothesis. [2]
- h) Write a short note on Recursively Enumerable languages. [3]
- i) Write about decidability of problems. [2]
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PART-B**(50 Marks)**

- 2.a) Convert the Moore machine to determine residue mod 3 into Mealy machine.
- b) Construct the minimum state automata for the following. [5+5]

	0	1
→A	B	C
B	B	C
C	B	C
D	B	E
ⓔ	B	C

OR

- 3.a) Convert the following NFA with ϵ to equivalent DFA:

	a	b	ϵ
→P	Φ	P	Q
Q	Q	Φ	R
ⓔ	Q	P	Φ

- b) Design NFA accepting string with a's and b's such that string containing two consecutive a's or two consecutive b's. [5+5]

4.a) For the following grammar give the leftmost and rightmost derivation for the string '00101'.

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 $B \rightarrow 0B / 1B / \epsilon$

b) Prove that the following language $\{a^n b^n \mid n \geq 1\}$ is not a regular. [5+5]

OR

5.a) Write a R.E. for the following DFA:

	a	b
$\rightarrow P$	Q	P
Q	Q	P

b) Construct the right linear grammar for the language $(0+1)^*00(0+1)^*$. [5+5]

6.a) Convert the following grammar to Greibach Normal Form

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b) Convert the following Context Free Grammar into Chomsky Normal Form
 $S \rightarrow aaaaS \mid aaaa$ [5+5]

OR

7.a) Reduce the following grammar such that there are no UNIT productions

$S \rightarrow AA$
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 $B \rightarrow abB \mid b \mid bb$

b) Construct CFG for the PDAM = $(\{q_0, q_1\}, \{0, 1\}, \{R, Z_0\}, \delta, q_0, Z_0, \Phi)$ and δ is given by

$\delta(q_0, 1, Z_0) = (q_0, RZ_0)$
 $\delta(q_0, 1, R) = (q_0, RR)$
 $\delta(q_0, 0, R) = (q_1, R)$
 $\delta(q_1, 0, Z_0) = (q_0, Z_0)$
 $\delta(q_0, \epsilon, Z_0) = (q_0, \epsilon)$
 $\delta(q_1, 1, R) = (q_1, \epsilon)$

[5+5]

8.a) Design a TM to recognize the language $L = \{0^n 1^n 0^n \mid n \geq 1\}$.

b) Design TM which will recognize strings containing equal number of a's and b's. [5+5]

OR

9.a) Design a TM to accept the language $L = \{w c w^R \mid w \in (a+b)^*\}$.

b) Design a TM to recognize all strings consisting of odd number of 1's. [5+5]

10.a) Give the closure properties of deterministic context free languages.

b) What are undecidable problems? Give example. [5+5]

OR

11.a) Give definitions of P and NP problems.

b) Explain TM halting problem. [5+5]

R13

Code No: 114DM

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

PRODUCTION TECHNOLOGY

(Common to ME, MCT, AME)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) What materials are used for moulding sand? [2]
- b) What is pressurized gating ratio? [3]
- c) What is the difference in design of torch tips in gas welding and gas cutting? [2]
- d) Mild steel can be welded by which flame of oxy-acetylene welding and why? [3]
- e) What are the different ways by which the metal is transferred in gas metal arc welding? [2]
- f) What are the advantages of laser beam welding? [3]
- g) What is strain hardening? [2]
- h) Explain the coining and embossing operations. [3]
- i) What is fullering operation? [2]
- j) Differentiate drop and press forging. [3]

PART-B

(50 Marks)

- 2.a) What are the types of gates used in the casting process?
 - b) What are the advantages of centrifugal casting as compared to other conventional methods of casting? [5+5]
- OR**
- 3.a) How chills and pads help in directional solidification?
 - b) What process is followed in shell moulding process? [3+7]
- 4.a) Differentiate DCRP and DCSP.
 - b) What purpose is served by coatings on the electrode during welding operation and what are the coating materials used? [5+5]
- OR**
- 5.a) Explain forge welding operation and its limitations.
 - b) How the heat energy is used in thermit welding process? [3+7]

- 6.a) Discuss any one non destructive testing of welds.
b) Distinguish soldering and brazing process and also state its applications. [5+5]

OR

- 7.a) Explain induction welding operation.
b) Explain diffusion welding operation with its applications. [3+7]

- 8.a) What are the various roll pass sequences?
b) Explain the sequences used in wire and tube drawing operations. [5+5]

OR

- 9.a) Differentiate hot and cold spinning.
b) Discuss the mechanics used in finding the angle of bite of the rolling operation. [3+7]

10. What are the various stages encountered in drop forging of lever. [10]

OR

- 11.a) What is impact extrusion?
b) Distinguish the forward and backward extrusion process. [3+7]

---ooOoo---

R09

Code No: 54063

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

MECHANICS OF FLUIDS AND HYDRAULIC MACHINES

(Common to ME, MIE)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Explain briefly the working principle of Bourdon Pressure Gauge with a neat sketch.
b) A simple manometer (U-tube) containing mercury is connected to a pipe in which an oil of sp.gr.0.8 is flowing. The pressure in the pipe is vacuum. The other end of the manometer is open to the atmosphere. Find the vacuum pressure in pipe, if the difference of mercury level in the two limbs is 20 cm and height of oil in the left limb from the centre of the pipe is 15 cm below. [7+8]
- 2.a) Differentiate between:
i) Bernoulli's equation and Euler's equation
ii) Velocity head and Pressure head
iii) Energy equation and momentum equation.
b) The centre line of a pipe conveying water is horizontal. The sectional areas at sections 1-1 and 2-2 are 5 m^2 and 2 m^2 respectively. The pressure intensity and velocity at section 1-1 are 39.25 kPa and 1.2 m/sec. respectively. Calculate the velocity and pressure at section 2-2. Ignore losses. [7+8]
- 3.a) Explain how the following flow problems are analyzed:
(i) series pipe connection and (ii) parallel pipe connection.
b) Kerosene of specific gravity 0.8 flows upwards through a 30 cm diameter by 15 cm diameter vertical venturi meter. The height of the converging cone is 50 cm. A mercury differential manometer connected between the inlet and throat shows deflection of 68 cm in mercury levels. Assuming $C_d = 0.985$, calculate the rate of flow. If the inlet pressure is 1.6 bars, what is the throat pressure? [7+8]
- 4.a) Explain the laminar and turbulent boundary layers.
b) Find the frictional drag on one side of the plate 150 mm wide and 400 mm long placed longitudinally in a stream of crude oil ($G=0.925$ and kinematic viscosity = 0.9 stoke) flowing with undisturbed velocity of 4m/sec. Also, find the thickness of boundary layer and the shear stress at the trailing edge of the plate. [7+8]
5. A jet of water having a velocity of 60m/sec is deflected by a vane moving at 25m/sec in a direction at 30° to the direction of jet. The water leaves the vane normally to the motion of the vane. Draw the inlet and outlet velocity triangles and find out the vane angles for no shock at entry and exit. Take the relative velocity at the exit as 0.8 times the relative velocity at the entrance. [15]
- 6.a) Describe the theory of a draft tube with the help of a neat sketch.
b) Design a single jet Pelton wheel to develop a power of 600 KW under a head of 180 m while running at 320 rpm. Assume $K_u = 0.45$, $C_v = 0.985$ and overall efficiency = 85%. Calculate the jet diameter, wheel diameter and number of buckets. Give a fully dimensional sketch of a bucket. [7+8]

7.a) What are the requirements of a good surge tank so that the efficiency of hydropower installation is maximum.

b) How is the Kaplan turbine governed? Explain with a neat diagram. [7+8]

8.a) Explain the classification of centrifugal pumps.

b) A centrifugal pump 20 cm diameter running at 1450 rpm delivers $0.1 \text{ m}^3/\text{s}$ against a head of 40m with an efficiency of 90%. Determine its specific speed. Derive the formula you use. [7+8]

---ooOoo---

R09

Code No: 54062

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

NETWORK THEORY
(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Determine the line current for the three-phase circuit shown in figure 1. $V_a = 110\angle 0^\circ$. Assume positive phase sequence.

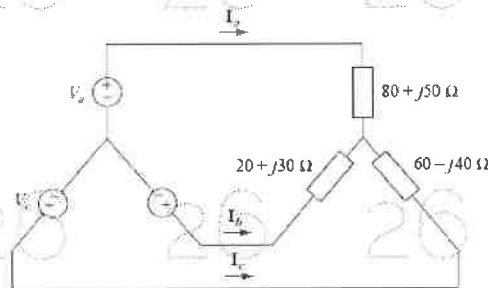


Figure: 1

- b) The two-wattmeter method produces wattmeter readings $P_1=1560$ W and $P_2=2100$ W and when connected to a delta-connected load. If the line voltage is 220 V, calculate: (i) the per-phase average power, (ii) the per phase reactive power, (iii) the power factor, and (iv) the phase impedance. [8+7]
2. Refer to the circuit shown in figure 2, the switch is closed at $t = 0$. (i) determine equations for i_L and v_L . (ii) At $t = 300$ ms, open the switch and determine equations for i_L and v_L during the decay phase. (iii) Determine voltage and current at $t = 100$ ms and at $t = 350$ ms. (iv) Sketch i_L and v_L . [15]

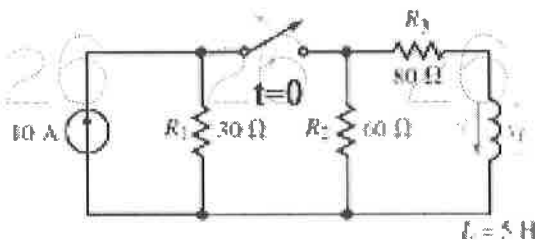


Figure: 2

3. A simple RL series circuit is excited by a sinusoidal voltage source. The circuit is initially relaxed. At $t=0$, the switch is closed find the response $i(t)$ for the current. Source voltage is $V_m \sin(\omega t + \phi)$. [15]

- 4.a) For the ladder network shown in figure 3 find (i) driving point input impedance Z_{11} (ii) transfer impedance function Z_{12} .

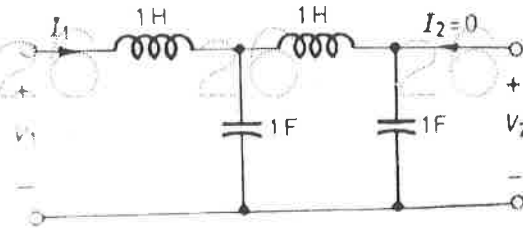


Figure: 3

- b) List the properties of transfer functions. [8+7]
- 5.a) Derive the relationship between hybrid and Z parameters of two port network?
 b) Obtain the ABCD parameters of the circuit shown in figure 4. [6+9]

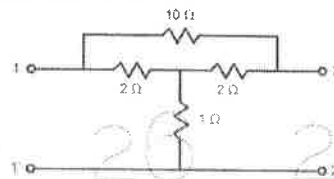


Figure: 4

6. Find the z parameters for the cascaded networks shown in figure 5. [15]

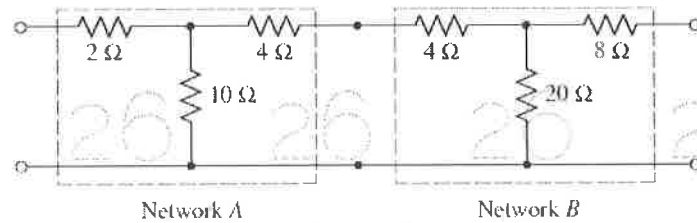


Figure: 5

7. If the band stop filter is to reject a 200-Hz sinusoid while passing other frequencies, calculate the values of L and C . Take $R = 150\Omega$ and the bandwidth as 100 Hz. [15]

- 8.a) Obtain the exponential Fourier series for the signal in Figure 6.

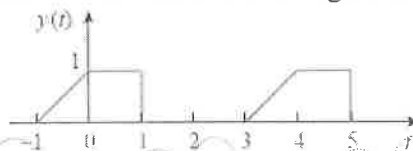


Figure: 6

- b) List the properties of Fourier transform. [8+7]

---ooOoo---

R09

Code No: 54019

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

PRINCIPLES OF ELECTRICAL ENGINEERING

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Derive an expression for current response in a RL circuit excited by D.C source by closing the switch at $t=0$.
b) Find the current $i(t)$, when the switch 'k' is closed at $t=0$, for the circuit given in figure 1. [6+9]

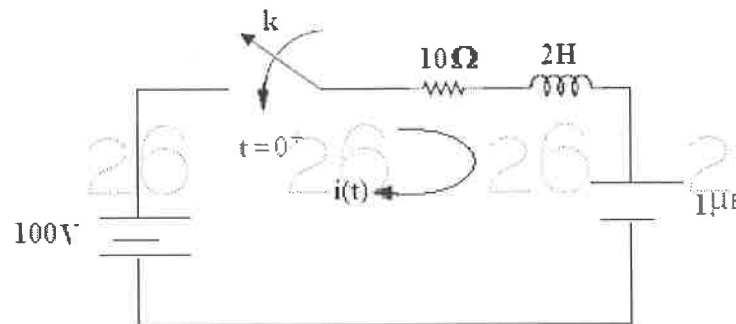


Figure: 1

- 2.a) In a two port network, Y - parameters are given as $Y_{11} = 0.4 \text{ mho}$; $Y_{12} = 0.2$; $Y_{21} = -0.1 \text{ mho}$ and $Y_{22} = 0.2 \text{ mho}$. Determine transmission parameters and write down the governing equations.
b) Find the y parameters of the two-port in figure 2. [8+7]

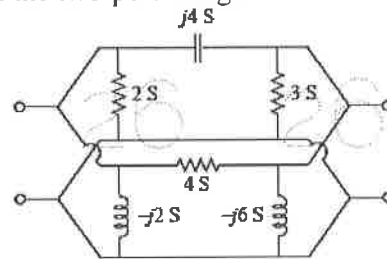


Figure: 2

- 3.a) Explain the variations of characteristic impedance (Z_0), attenuation constant (α) and phase constant (β) with frequency with the help of neat sketch in band pass filter.
b) Design m-derived T type low pass filter to work into load of 400Ω and cut off frequency at 5 kHz and peak attenuation at 5.5 kHz. [8+7]

- 4.a) Write a note on:
i) Balanced attenuators
ii) Variable attenuators.
- b) Design (i) π -type attenuator and (ii) Bridged-T attenuator with the following specifications, Attenuation = 30dB; characteristic resistance = 400Ω . [8+7]
- 5.a) Sketch and explain the magnetization and load characteristics of a d.c shunt generator.
- b) A long shunt d.c compound generator delivers a load current of 60 A at 500 V and has armature, series field, shunt field resistances of 0.04Ω , 0.02Ω and 300Ω respectively. Calculate the generated voltage and the armature current. Allow 1V per brush for contact drop. [7+8]
- 6.a) Explain the various methods of speed control of a DC shunt motor.
- b) A 500V, d.c. shunt motor takes 6A on no load, the armature resistance is 0.2Ω and field current is 1A. Estimate the output and efficiency when the input current is 10A. [7+8]
- 7.a) Explain different losses of a transformer. Also, state different methods to reduce these losses.
- b) The iron losses in a transformer core at normal flux density were measured at frequencies of 30Hz and 50Hz and the results being 24 W and 65 W respectively. Calculate the hysteresis and eddy current losses at 50Hz. [7+8]
- 8.a) Explain how the single-phase induction motors made self-starting?
- b) Explain the working principle of a stepper motor. And draw the speed-torque characteristics: [7+8]

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R15

Code No: 224AE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Pharmacy II Year II Semester Examinations, December-2017

ENVIRONMENTAL STUDIES

Time: 3hours

Max.Marks:75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) What is Biomagnification? [2]
- b) Write short note on carrying capacity. [3]
- c) Give any three characteristics of forest ecosystem. [2]
- d) What is a mineral? [3]
- e) Name any two threats to biodiversity. [2]
- f) State the difference between productive and consumptive use. [3]
- g) List the sources of air pollution with examples. [2]
- h) List the effects of noise pollution. [3]
- i) Define the concept of sustainable development? [2]
- j) What is life cycle assessment? [3]

PART- B

(50 Marks)

- 2.a) Explain the structure of an ecosystem.
- b) Describe the biotic and abiotic components of an ecosystem. [5+5]

OR

- 3.a) With a neat labelled diagram, explain the cycling of nutrients through various components of ecosystem.
- b) Explain the difference between pyramid of biomass and pyramid of energy. [5+5]
- 4.a) Discuss the energy requirement in detail for sustaining urban life.
- b) What are the differences between renewable and non-renewable energy sources with examples? [5+5]

OR

- 5.a) What are the natural resources available in India and discuss any two of them.
- b) Enumerate the effects caused due to over exploitation of surface and groundwater. [5+5]
- 6.a) Briefly enumerate the status of India as mega diversity nation of biodiversity.
- b) Discuss various strategies for conserving biodiversity. [5+5]

OR

- 7.a) Explain the value of bio diversity.
- b) Write briefly about National Biodiversity act. [5+5]

8.a) Explain the chemical reactions taking place in the Stratosphere that is leading to the Ozone layer depletion?

b) Explain the management of solid waste in an urban area. [5+5]

OR

9.a) Discuss in brief the control measures of air pollution.

b) Explain the different stages of municipal sewage treatment. [5+5]

10.a) What is meant by green building concept?

b) Write the objectives, principles, and importance of environmental impact assessment? [5+5]

OR

11.a) Explain briefly the concept of environmental management plan?

b) Write briefly about Forest Conservation Act. [5+5]

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R09

Code No: R9304

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Pharmacy II Year II Semester Examinations, December-2017

PHYSICAL PHARMACY - II

Time: 3hours

Max.Marks:75

**Answer any five questions
All questions carry equal marks**

- 1.a) Write a note on importance of solubility in drug discovery and delivery.
b) Discuss the different methods to determine the order of a reaction. [7+8]
- 2.a) Differentiate between surface tension and interfacial tension.
b) Discuss about various types of adsorption isotherms. [5+10]
- 3.a) Write a note on pH solubility profile of drug and why solubility should be determined at different pH conditions.
b) Discuss in brief about organic molecular complexes. [7+8]
- 4.a) Define ligand and coordination number in a complex. Write a short note on chelates.
b) A solution of a drug contains 500 mg/mL when prepared. Analysis after 80 days was found to contain 300 mg/mL. Assuming the first order decomposition, calculate at what time will the drug have decomposed to one-half of its original concentration. [8+7]
- 5.a) Enumerate different methods used to determine the particle size.
b) What are derived properties of powders and give their role in pharmaceutical formulation.
c) Define viscosity and kinematic viscosity along with formulae and units. Give applications of viscosity in pharmacy. [3+3+9]
- 6.a) Discuss in detail methods for determining surface area.
b) Discuss in detail dilatant flow and thixotropy. [8+7]
7. Discuss in detail the electrical properties of colloids and how they affect stability of colloidal systems. [15]
- 8.a) Discuss rheological properties of emulsions.
b) Discuss different formulation aspects of suspensions. [7+8]

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R15

Code No: 124CQ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

DATABASE MANAGEMENT SYSTEMS

(Common to CSE, IT)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

- 1.a) What are five main functions of a database administrator? [2]
- b) List and explain the database system applications. [3]
- c) Define a trigger. What are the differences between row level and statement level triggers? [2]
- d) How are queries expressed in SQL? [3]
- e) List the benefits of BCNF and 3NF. [2]
- f) Write the Properties of Decompositions. [3]
- g) Why is recoverability of schedules desirable? [2]
- h) Suppose that there is a database system that never fails. Is a recovery manager required for this system? [3]
- i) How is data organized in a hash based index? [2]
- j) Give a brief note on Static Hashing. [3]

PART - B

(50 Marks)

- 2.a) What is a partial key? How is it represented in ER diagram? Give an example.
- b) Define query. Explain the data manipulation language in detail. [5+5]

OR

- 3.a) Explain how to build ER model for university with entities department, instructor, student, and class. Instructors and students belong to one department only. Instructors and students related to a class with many to many relations. Assume suitable attributes. Explain how the ER model can be translated to relations.
- b) List and explain the design issues of entity relationship. [5+5]

4. Consider the following schema
instructor (ID, name, dept_name),
teaches (ID, course_id, sec_id, semester, year),
section (course_id, sec_id, semester, year),
student (ID, name, dept_name),
takes (ID, course_id, sec_id, semester, year, grade)
Write the following queries in SQL
a) Find the names of the students not registered in any section
b) Find the names of the instructors not teaching any course
c) Find the total number of courses taught department wise
d) Find the total number of courses registered department wise. [10]

OR

5.a) Make a comparison between the tuple relational calculus and domain relational calculus.

b) What are nested queries? What is correlation in nested queries? Explain. [5+5]

6. Discuss how schema refinement through dependency analysis and normalization can improve schemas obtained through ER design. [10]

OR

7. Why is a table whose primary key consists of a single attribute automatically in 2NF when it is in 1NF? Explain. [10]

8. Discuss about log based recovery with immediate update and deferred update with suitable examples. [10]

OR

9. When a transaction is rolled back under timestamp ordering, it is assigned a new timestamp. Why can it not simply keep its old timestamp? [10]

10.a) Give a brief note on Indexed Sequential Access Methods.

b) Make a comparison between the primary index and a secondary index. [5+5]

OR

11. Where does a DBMS store persistent data? How does it bring data into main memory for processing? What DBMS component reads and writes data from main memory, and what is the unit of I/O? [10]

---oo0oo---

R15

Code No: 124DD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

MATHEMATICS – II

(Common to ME, MCT, MIE, MSNT)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

1. a) Find a vector normal to the surface $xyz^2 = 20$ at the point $(1, 1, 2)$. [2]
 b) If $\vec{F} = \nabla u$, where u , is scalar field and \vec{F} is a vector field, show that $\vec{F} \cdot \text{curl } \vec{F} = 0$. [3]
 c) Write down the Dirichlet's conditions for expressing a function as a Fourier series. [2]
 d) Obtain the half range cosine series for the function $f(x) = x$ in $(0, \pi)$. [3]
 e) With usual notations, prove that $(1 + \Delta)(1 - \nabla) = 1$. [2]
 f) Find the cubic polynomial which takes the following values: [3]

x:	0	1	2	3
f(x):	1	2	1	10

- g) Find a real root of the equation $x^3 + x - 6.5 = 0$ using Bisection method. [2]
 h) Explain Newton Raphson method. What is its geometrical significance? [3]
 i) Evaluate the integral $\int_0^1 \frac{1}{1+x} dx$ using Simpson's 1/3rd rule taking two subintervals. [2]
 j) Explain Taylor series method for solving a differential equation. [3]

PART-B**(50 Marks)**

- 2.a) Show that the vector $\vec{F} = (x + 3y)\vec{i} + (y - 3z)\vec{j} + (x - 2z)\vec{k}$ is solenoidal and also find $\vec{F} \cdot \text{curl } \vec{F}$. [2]
 b) In what direction from $(3, 1, -2)$ is the directional derivative of $\phi = x^3y^2 + yz$ maximum? Find also the magnitude of this maximum. [5+5]

OR

3. State Stokes theorem. Verify it for the vector field $\vec{F} = (2x - y)\vec{i} - yz^2\vec{j} - y^2z\vec{k}$ over the upper half surface of the sphere $x^2 + y^2 + z^2 = 1$, bounded by its projection on the xy -plane. [10]

4.a) If $f(x) = \begin{cases} \sin x, & 0 \leq x \leq \frac{\pi}{4} \\ \cos x, & \frac{\pi}{4} \leq x \leq \frac{\pi}{2} \end{cases}$ obtain the half-range sine series.

b) Find the Fourier transform of $f(x) = \begin{cases} 1, & |x| \leq a \\ 0, & |x| > a \end{cases}$. Hence prove that $\int_0^{\infty} \frac{\sin^2 ax}{x^2} dx = \frac{\pi a}{2}$. [5+5]

OR

5.a) Determine the Fourier series for the function $\frac{\pi-x}{2}$ in $-\pi < x < \pi$.

b) Find the Fourier sine transform of $f(x) = e^{-|x|}$. Hence prove that

$$\int_0^{\infty} \frac{x \sin mx}{1+x^2} dx = \frac{\pi}{2} e^{-m}, m > 0. \quad [5+5]$$

6.a) Given the following values:

x	5	7	11	13	17
$f(x)$	150	392	1452	2366	5202

Evaluate $f(9)$, using Lagrange's interpolation formula.

b) An experiment gave the following values:

$v(ft/min)$	350	400	500	600
$t(min)$	61	26	7	2.6

It is known that v and t are connected by the relation $v = at^b$. Find the best possible values of a and b by the method of least squares. [5+5]

OR

7.a) Find $y(25)$, given that $y_{20} = 24, y_{24} = 32, y_{28} = 35, y_{32} = 40$, using Gauss forward difference formula.

b) Fit a parabolic curve to the following data and evaluate $y(10)$. [5+5]

x	1	2	3	4	5	6	7
$y(x)$	14	17	22	35	67	89	102

8.a) Find a real root of the equation $x^3 - 2 \log_e x - 4 = 0$ correct to three decimal places using the method of false position.

b) Solve the system of equations $2x_1 - x_2 = 7; -x_1 + 2x_2 - x_3 = 1; -x_2 + 2x_3 = 1$ using Gauss-Seidel iteration method starting with the approximation $X^0 = [0, 0, 0]^T$. [5+5]

OR

9.a) Find a real root of the equation $x^3 + 3x - 1 = 0$ correct upto three decimal places using general iteration method.

b) Solve the system of equations using Crout's method: [5+5]

$$x_1 + x_2 - x_3 = 2; \quad 2x_1 + 3x_2 + 5x_3 = -3; \quad 3x_1 + x_2 - 3x_3 = 6.$$

10.a) Obtain $y(0.1)$ given that $y' = \frac{y-x}{y+x}$, $y(0) = 1$, by Picard's method.

b) Using Modified Euler's method, find the value of y when x is 0.1, 0.2, and 0.3 given that $y' = 1 + y$, $y(0) = 1$. [5+5]

OR

11.a) Apply Runge-Kutta method of 4th order to find an approximate value of y when $x = 1.2$ in steps of 0.1, given that $y' = 2x^2 + y^2$, $y(1) = 1.5$.

b) Explain Shooting method and use it to solve the boundary value problem [5+5]

$$u'' = u + 1, \quad 0 < x < 1, \quad u(0) = 0, \quad u(1) = e - 1.$$

---ooOoo---

R15

Code No: 124AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

NETWORK THEORY

(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) Write the relationships between line and phase currents and line and phase voltages for a star connected system. [2]
- b) Given that voltage $V_{bn} = 110 \angle 30^\circ$ in a balanced 3-phase system. Find V_{an} and V_{cn} assuming a positive phase sequence (ABC). [3]
- c) Explain the time constant of R-L and R-C circuits. [2]
- d) A circuit consists of a resistor connected in series with a $0.5 \mu\text{F}$ capacitor and has a time constant of 12 milli-sec. Determine value of resistor and capacitor voltage at 7 milli-sec after connecting circuit to a 10 V supply. [3]
- e) Give the properties of driving point function. [2]
- f) What are the necessary conditions for transfer function? [3]
- g) Write the conditions for symmetry and reciprocity with reference to h-parameters? [2]
- h) In a two port network, $Z_{11}=100 \Omega$; $Z_{12}=Z_{21}=120 \Omega$; $Z_{22}=50 \Omega$. Compute Y_{11} , Y_{12} and Y_{22} . [3]
- i) Define line spectra and phase angle spectra. [2]
- j) Obtain the Fourier transform of constant signal. [3]

PART-B**(50 Marks)**

- 2.a) A star-connected load, each phase of which has an inductive reactance of 50Ω and resistance of 15Ω connected in series, is fed from the secondary of a three-phase, delta-connected transformer. If the transformer phase voltage is 400 V, calculate i) the potential difference across each phase of the load, ii) the load phase current, iii) the current in the transformer secondary windings, and iv) the power and power factor. [5+5]
- b) Explain the reactive power measurement by single watt meter method in a balanced three phase system. [5+5]

OR

- 3.a) A load impedance of $(4 + j3)$ ohms each in each phase are connected in a star and a supply voltage of 415 V, 50 Hz is applied to the load. Find (i) line current, (ii) power factor, (iii) power, (iv) reactive volt amperes, and (v) apparent power. [5+5]
- b) Show that power consumed by three identical phase loads connected in delta is equal to three times power consumed when phase loads are connected in star. [5+5]

4.a) A series R-C circuit, with $R=50$ ohms, $C=10 \mu\text{F}$ has a sinusoidal voltage of $230 \sin 314t$. Find the transient response.

b) A series R-L circuit is applied with a sinusoidal voltage source $v(t) = V_m \sin(\omega t + \phi)$ at time when $\phi = 0$. Find the expression for current. [5+5]

OR

5.a) A sinusoidal voltage $v(t) = V_m \sin 100\pi t$ is applied at $t = 0.01$ seconds to a series R-L circuit, where $R=10$ ohms and $L=0.1$ H. Calculate the ratio of maximum value of current (to which it rises) to the steady state value of current.

b) Derive an expression for current in a series R-L circuit with sinusoidal excitation. [5+5]

6.a) Explain the significance of poles and zeros in given network function.

b) For the given network function, draw the pole zero diagram and hence obtain time domain response $i(t)$. $I(s) = \frac{5s}{(s+1)(s^2+4s+8)}$ [5+5]

OR

7.a) Show pole-zero plot of the given network function $V(s)$ and obtain $v(t)$.

$$V(s) = \frac{10s}{(s+3)(s+2)}$$

b) Find pole-zero plot of the network shown in Figure 1. [5+5]

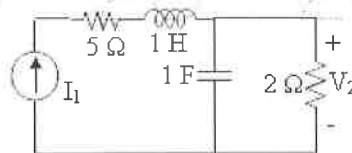


Figure: 1

8. Obtain z- and y-parameters for the network shown in Figure 2. [10]

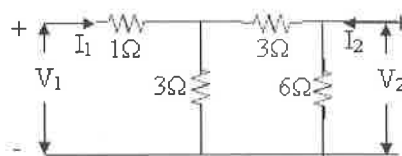


Figure: 2

OR

9.a) Two part networks are connected in cascade. Prove that overall transmission parameter matrix is the product of individual transmission parameters matrices.

b) Express ABCD parameters in terms of Z-parameters. [5+5]

- 10.a) Explain about the exponential form of Fourier series.
b) Design a constant-K T-section band pass filter with cutoff frequencies of 1 kHz and 4 kHz. The design impedance is 600 ohms. [5+5]

OR

- 11.a) Explain the properties and applications of Fourier transform.
b) Find the line spectrum of the waveform shown in Figure 3 using Fourier analysis. [5+5]

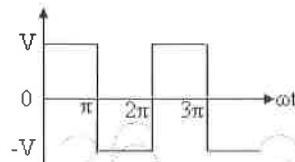


Figure: 3

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R15

Code No: 124DN

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

PULSE AND DIGITAL CIRCUITS

(Common to ECE, ETM)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) What is Differentiator and draw the circuit diagram of a Differentiator. [2]
- b) What is Attenuators and explain its application? [3]
- c) List out different applications of Clipper. [2]
- d) Draw the circuit diagram of Transistor clipper and explain its operation. [3]
- e) What is an ideal diode? How does an actual diode differ from an ideal diode? [2]
- f) Draw and explain how transistor used as a switch? [3]
- g) Define UTP and LTP of a Schmitt trigger. [2]
- h) What is Multivibrator and explain different types of multivibrators? [3]
- i) Draw the circuit diagram of AND gate using Diodes. [2]
- j) List out the merits and demerits of CML logic. [3]

PART-B

(50 Marks)

- 2.a) Design a High pass RC circuit when $R=20K\Omega$, and $F=50Hz$, and explain its operation along with wave forms.
- b) What is Ringing Circuit and explain its operation along with circuit diagram. [5+5]

OR

- 3.a) Design low pass RC circuits for their response for Square wave is applied to it along with circuit diagrams.
- b) Draw the RLC parallel circuit when step input is applied to it and explain its operation. [5+5]

- 4.a) Draw the circuit diagram of limiter using Zener diode and explain its operation along with transfer characteristics.

- b) What is synchronized clamping circuit and explain the operation along with circuit diagram. [5+5]

OR

- 5.a) Define Clamping Circuit Theorem and explain its operation when the capacitor value is very large.

- b) List out the few differences between clipper and clamper with examples. [5+5]

- 6.a) Draw the circuit diagram of unidirectional diode AND gate with multiple control signals and explain its operation.
- b) List out and derive the different Temperature variation of Saturation Parameters of a-transistor. [5+5]

OR

- 7.a) Draw and explain the circuit diagram of two-input sampling gate that avoids loading on the control signal.
- b) Explain the terms Rise time, fall time, Hold time of a transistor characteristics in detail. [5+5]

- 8.a) What is hysteresis and explain the different methods for avoiding hysteresis in Schmitt trigger in detail.
- b) Draw the circuit diagram of Emitter-coupled monostable multivibrator and explain its operation in detail. [5+5]

OR

- 9.a) Draw the circuit diagram of Transistor Bootstrap Time Base Generator and explain its operation in detail.
- b) Draw the circuit diagram of Transistor Miller Time Base generator and explain its operation. [5+5]
- 10.a) Draw the circuit diagram of Synchronization of Astable Blocking Oscillators and explain its operation.
- b) List out the few comparisons of TTL, RTL and CML logic families. [5+5]

OR

- 11.a) Explain the concept of Frequency division in Sweep Circuit along with circuit diagram.
- b) Draw and explain the block diagram of frequency divider without phase jitter. [5+5]

---ooOoo---

R13

Code No: 114AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

HYDRAULICS AND HYDRAULIC MACHINERY

(Common to CE, CEE)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) Define and Explain critical bed slope. [2]
- b) Distinguish between open channel flow and pipe flow. [3]
- c) What are the applications of Rayleigh's method? [2]
- d) Explain the term dynamic similarity along with its significances. [3]
- e) Draw a simple layout of a typical hydro power installation. [2]
- f) Distinguish between impact of jet and jet propulsion. [3]
- g) State the functions of draft tube. [2]
- h) Derive the expression for work done and efficiency of Pelton turbine. [3]
- i) Define load factor and mention its significance. [2]
- j) What is the significance of minimum starting speed in C.P? [3]

PART-B**(50 Marks)**

2. In a rectangular channel, $b = 3\text{m}$, $n = 0.015$, $S_0 = 0.0005$ and $Q = 5\text{ m}^3/\text{s}$. At the entrance to the channel, flow issues from a sluice gate at a depth of 0.15 m . The channel is sufficiently long that uniform flow conditions are established away from the entrance region. Find the nature of the water surface profile in the vicinity of the entrance. [10]

OR

3. Derive the condition for depth of flow of a most economical circular channel Section subject to the condition for maximum velocity. [10]

- 4.a) State Buckingham's - theorem. Why this theorem is considered superior over the Rayleigh's method for dimensional analysis.
- b) What is meant by geometric, kinematic and dynamic similarities? [5+5]

OR

- 5.a) What are similarities between model and prototype. Mention the applications of model testing.
- b) A spillway model is constructed on a scale of 1:25. Calculate:
 - i) the prototype discharge corresponding to model discharge of $0.12\text{ m}^3/\text{sec}$
 - ii) the velocity in model corresponding to prototype velocity of 3.5 m/s . [5+5]

6. A nozzle of size 10 cm in diameter issues a jet of water with a velocity 50 m/sec . The jet strikes a moving plate perpendicularly at the centre. The plate is moving with velocity of 15 m/sec in the direction of jet. Calculate:

- a) The force exerted on the plate b) The work done c) Efficiency of the jet. [10]

OR

7. A Jet of water of 30mm diameter, moving with a velocity of 15 m/s, strikes a hinged square plate weight 245.25 N at the center of the plate. If the plate is of uniform thickness, find the angle through which the plate will swing. [10]

8. The following data is related to the Pelton wheel: Head at the base of the nozzle = 110m. Diameter of the Jet = 7.5 cm. Discharge of the nozzle = 200 lit/sec. shaft power 191.295 KW. Power absorbed in mechanical resistance = 3.675 KW. Determine: a) Power lost in nozzle and b) Power lost due to Hydraulic Resistance in the runner. [10]

OR

9. A Kaplan turbine develops 60,000 kW of power under a head of 25m with an overall efficiency of 90%. Taking the value of flow ratio $\psi = 0.5$, speed ratio $\phi = 1.6$, the hub diameter as 0.35 times the diameter of the runner, find:
a) The diameter of the runner
b) The speed of the turbine
c) The specific speed of the turbine. [10]

10.a) Explain: Priming, specific speed of a centrifugal pump.

b) Explain the working principle of single-stage and multistage centrifugal pumps? [10]

OR

11. A centrifugal Pump has the following characteristics: Outer diameter of impeller = 800 mm, width of impeller vane at outlet = 100mm, angle of impeller vanes at outlet = 60° , the impeller runs at 550 rpm delivers $0.98 \text{ m}^3/\text{sec}$ of water under an effective head of 35m. a 500 KW motor is used to drive pump. Determine the manometric, mechanical and overall efficiency of the pump. Assume water enters the impeller vanes radially at inlet. [10]

---ooOoo---

R13

Code No: 114AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

NETWORK THEORY

(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) Write the relationships between line and phase currents and line and phase voltages for a star connected system. [2]
- b) Given that voltage $V_{bn} = 110 \angle 30^\circ$ in a balanced 3-phase system. Find V_{an} and V_{cn} assuming a positive phase sequence (ABC). [3]
- c) Explain the time constant of R-L and R-C circuits. [2]
- d) A circuit consists of a resistor connected in series with a $0.5 \mu\text{F}$ capacitor and has a time constant of 12 milli-sec. Determine value of resistor and capacitor voltage at 7 milli-sec after connecting circuit to a 10 V supply. [3]
- e) Give the properties of driving point function. [2]
- f) What are the necessary conditions for transfer function? [3]
- g) Write the conditions for symmetry and reciprocity with reference to h-parameters? [2]
- h) In a two port network, $Z_{11}=100 \Omega$; $Z_{12}=Z_{21}=120 \Omega$; $Z_{22}=50 \Omega$. Compute Y_{11} , Y_{12} and Y_{22} . [3]
- i) Define line spectra and phase angle spectra. [2]
- j) Obtain the Fourier transform of constant signal. [3]

PART-B**(50 Marks)**

- 2.a) A star-connected load, each phase of which has an inductive reactance of 50Ω and resistance of 15Ω connected in series, is fed from the secondary of a three-phase, delta-connected transformer. If the transformer phase voltage is 400 V, calculate i) the potential difference across each phase of the load, ii) the load phase current, iii) the current in the transformer secondary windings, and iv) the power and power factor.
- b) Explain the reactive power measurement by single watt meter method in a balanced three phase system. [5+5]

OR

- 3.a) A load impedance of $(4 + j3)$ ohms each in each phase are connected in a star and a supply voltage of 415 V, 50 Hz is applied to the load. Find (i) line current, (ii) power factor, (iii) power, (iv) reactive volt amperes, and (v) apparent power.
- b) Show that power consumed by three identical phase loads connected in delta is equal to three times power consumed when phase loads are connected in star. [5+5]

4.a) A series R-C circuit, with $R=50$ ohms, $C=10 \mu\text{F}$ has a sinusoidal voltage of $230 \sin 314t$. Find the transient response.

b) A series R-L circuit is applied with a sinusoidal voltage source $v(t) = V_m \sin(\omega t + \phi)$ at time when $\phi = 0$. Find the expression for current. [5+5]

OR

5.a) A sinusoidal voltage $v(t) = V_m \sin 100\pi t$ is applied at $t = 0.01$ seconds to a series R-L circuit, where $R=10$ ohms and $L=0.1$ H. Calculate the ratio of maximum value of current (to which it rises) to the steady state value of current.

b) Derive an expression for current in a series R-L circuit with sinusoidal excitation. [5+5]

6.a) Explain the significance of poles and zeros in given network function.

b) For the given network function, draw the pole zero diagram and hence obtain time domain response $i(t)$. $I(s) = \frac{5s}{(s+1)(s^2+4s+8)}$ [5+5]

OR

7.a) Show pole-zero plot of the given network function $V(s)$ and obtain $v(t)$.

$$V(s) = \frac{10s}{(s+3)(s+2)}$$

b) Find pole-zero plot of the network shown in Figure 1. [5+5]

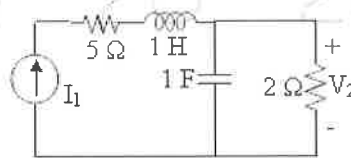


Figure: 1

8. Obtain z- and y-parameters for the network shown in Figure 2. [10]

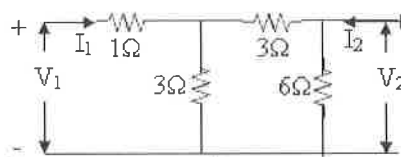


Figure: 2

OR

9.a) Two part networks are connected in cascade. Prove that overall transmission parameter matrix is the product of individual transmission parameters matrices.

b) Express ABCD parameters in terms of Z-parameters. [5+5]

- 10.a) Explain about the exponential form of Fourier series.
b) Design a constant-K T-section band pass filter with cutoff frequencies of 1 kHz and 4 kHz. The design impedance is 600 ohms. [5+5]

OR

- 11.a) Explain the properties and applications of Fourier transform.
b) Find the line spectrum of the waveform shown in Figure 3 using Fourier analysis. [5+5]

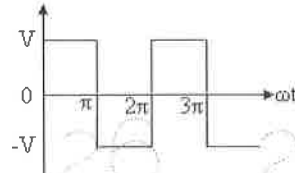


Figure: 3

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R13

Code No: 114DD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

MATHEMATICS – II

(Common to ME, MCT, MIE, MSNT)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) Find a vector normal to the surface $xyz^2 = 20$ at the point $(1, 1, 2)$. [2]
- b) If $\vec{F} = \nabla u$, where u , is scalar field and \vec{F} is a vector field, show that $\vec{F} \cdot \text{curl } \vec{F} = 0$. [3]
- c) Write down the Dirichlet's conditions for expressing a function as a Fourier series. [2]
- d) Obtain the half range cosine series for the function $f(x) = x$ in $(0, \pi)$. [3]
- e) With usual notations, prove that $(1 + \Delta)(1 - \nabla) = 1$. [2]
- f) Find the cubic polynomial which takes the following values: [3]

x:	0	1	2	3
f(x):	1	2	1	10

- g) Find a real root of the equation $x^3 + x - 6.5 = 0$ using Bisection method. [2]
- h) Explain Newton Raphson method. What is its geometrical significance? [3]
- i) Evaluate the integral $\int_0^1 \frac{1}{1+x} dx$ using Simpson's 1/3rd rule taking two subintervals. [2]
- j) Explain Taylor series method for solving a differential equation. [3]

PART-B**(50 Marks)**

- 2.a) Show that the vector $\vec{F} = (x + 3y)\vec{i} + (y - 3z)\vec{j} + (x - 2z)\vec{k}$ is solenoidal and also find $\vec{F} \cdot \text{curl } \vec{F}$. [2]
- b) In what direction from $(3, 1, -2)$ is the directional derivative of $\phi = x^3y^2 + yz$ maximum? Find also the magnitude of this maximum. [5+5]

OR

3. State Stokes theorem. Verify it for the vector field $\vec{F} = (2x - y)\vec{i} - yz^2\vec{j} - y^2z\vec{k}$ over the upper half surface of the sphere $x^2 + y^2 + z^2 = 1$, bounded by its projection on the xy -plane. [10]

4.a) If $f(x) = \begin{cases} \sin x, & 0 \leq x \leq \frac{\pi}{4} \\ \cos x, & \frac{\pi}{4} \leq x \leq \frac{\pi}{2} \end{cases}$, obtain the half-range sine series.

b) Find the Fourier transform of $f(x) = \begin{cases} 1, & |x| \leq a \\ 0, & |x| > a \end{cases}$. Hence prove that $\int_0^{\infty} \frac{\sin^2 ax}{x^2} dx = \frac{\pi a}{2}$. [5+5]

OR

5.a) Determine the Fourier series for the function $\frac{\pi-x}{2}$ in $-\pi < x < \pi$.

b) Find the Fourier sine transform of $f(x) = e^{-|x|}$. Hence prove that $\int_0^{\infty} \frac{x \sin mx}{1+x^2} dx = \frac{\pi}{2} e^{-m}$, $m > 0$. [5+5]

6.a) Given the following values:

x	5	7	11	13	17
$f(x)$	150	392	1452	2366	5202

Evaluate $f(9)$, using Lagrange's interpolation formula.

b) An experiment gave the following values:

$v(ft/min)$	350	400	500	600
$t(min)$	61	26	7	2.6

It is known that v and t are connected by the relation $v = at^b$. Find the best possible values of a and b by the method of least squares. [5+5]

OR

7.a) Find $y(25)$, given that $y_{20} = 24, y_{24} = 32, y_{28} = 35, y_{32} = 40$, using Gauss forward difference formula.

b) Fit a parabolic curve to the following data and evaluate $y(10)$. [5+5]

x	1	2	3	4	5	6	7
$y(x)$	14	17	22	35	67	89	102

8.a) Find a real root of the equation $x^3 - 2 \log_e x - 4 = 0$ correct to three decimal places using the method of false position.

b) Solve the system of equations $2x_1 - x_2 = 7; -x_1 + 2x_2 - x_3 = 1; -x_2 + 2x_3 = 1$ using Gauss-Seidel iteration method starting with the approximation $X^0 = [0, 0, 0]^T$. [5+5]

OR

9.a) Find a real root of the equation $x^3 + 3x - 1 = 0$ correct upto three decimal places using general iteration method.

b) Solve the system of equations using Crout's method: [5+5]
 $x_1 + x_2 - x_3 = 2; 2x_1 + 3x_2 + 5x_3 = -3; 3x_1 + x_2 - 3x_3 = 6$.

10.a) Obtain $y(0.1)$ given that $y' = \frac{y-x}{y+x}$, $y(0) = 1$, by Picard's method.

b) Using Modified Euler's method, find the value of y when x is 0.1, 0.2, and 0.3 given that $y' = 1 + y$, $y(0) = 1$. [5+5]

OR

11.a) Apply Runge-Kutta method of 4th order to find an approximate value of y when $x = 1.2$ in steps of 0.1, given that $y' = 2x^2 + y^2$, $y(1) = 1.5$.

b) Explain Shooting method and use it to solve the boundary value problem [5+5]

$$u'' = u + 1, \quad 0 < x < 1, \quad u(0) = 0, \quad u(1) = e - 1.$$

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R13

Code No: 114CQ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

DATABASE MANAGEMENT SYSTEMS

(Common to CSE, IT)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

- 1.a) What are five main functions of a database administrator? [2]
- b) List and explain the database system applications. [3]
- c) Define a trigger. What are the differences between row level and statement level triggers? [2]
- d) How are queries expressed in SQL? [3]
- e) List the benefits of BCNF and 3NF. [2]
- f) Write the Properties of Decompositions. [3]
- g) Why is recoverability of schedules desirable? [2]
- h) Suppose that there is a database system that never fails. Is a recovery manager required for this system? [3]
- i) How is data organized in a hash based index? [2]
- j) Give a brief note on Static Hashing. [3]

PART - B

(50 Marks)

- 2.a) What is a partial key? How is it represented in ER diagram? Give an example.
- b) Define query. Explain the data manipulation language in detail. [5+5]

OR

- 3.a) Explain how to build ER model for university with entities department, instructor, student, and class. Instructors and students belong to one department only. Instructors and students related to a class with many to many relations. Assume suitable attributes. Explain how the ER model can be translated to relations.
- b) List and explain the design issues of entity relationship. [5+5]

4. Consider the following schema
instructor (ID, name, dept_name),
teaches (ID, course_id, sec_id, semester, year),
section (course_id, sec_id, semester, year),
student (ID, name, dept_name),
takes (ID, course_id, sec_id, semester, year, grade)
Write the following queries in SQL
a) Find the names of the students not registered in any section
b) Find the names of the instructors not teaching any course
c) Find the total number of courses taught department wise
d) Find the total number of courses registered department wise. [10]

OR

5.a) Make a comparison between the tuple relational calculus and domain relational calculus.

b) What are nested queries? What is correlation in nested queries? Explain. [5+5]

6. Discuss how schema refinement through dependency analysis and normalization can improve schemas obtained through ER design. [10]

OR

7. Why is a table whose primary key consists of a single attribute automatically in 2NF when it is in 1NF? Explain. [10]

8. Discuss about log based recovery with immediate update and deferred update with suitable examples. [10]

OR

9. When a transaction is rolled back under timestamp ordering, it is assigned a new timestamp. Why can it not simply keep its old timestamp? [10]

10.a) Give a brief note on Indexed Sequential Access Methods.

b) Make a comparison between the primary index and a secondary index. [5+5]

OR

11. Where does a DBMS store persistent data? How does it bring data into main memory for processing? What DBMS component reads and writes data from main memory, and what is the unit of I/O? [10]

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R13

Code No: 114DN

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

PULSE AND DIGITAL CIRCUITS
(Electronics and Communication Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) What is Differentiator and draw the circuit diagram of a Differentiator. [2]
- b) What is Attenuators and explain its application? [3]
- c) List out different applications of Clipper. [2]
- d) Draw the circuit diagram of Transistor clipper and explain its operation. [3]
- e) What is an ideal diode? How does an actual diode differ from an ideal diode? [2]
- f) Draw and explain how transistor used as a switch? [3]
- g) Define UTP and LTP of a Schmitt trigger. [2]
- h) What is Multivibrator and explain different types of multivibrators? [3]
- i) Draw the circuit diagram of AND gate using Diodes. [2]
- j) List out the merits and demerits of CML logic. [3]

PART-B

(50 Marks)

- 2.a) Design a High pass RC circuit when $R=20K\Omega$, and $F=50Hz$, and explain its operation along with wave forms.
- b) What is Ringing Circuit and explain its operation along with circuit diagram. [5+5]

OR

- 3.a) Design low pass RC circuits for their response for Square wave is applied to it along with circuit diagrams.
- b) Draw the RLC parallel circuit when step input is applied to it and explain its operation. [5+5]

- 4.a) Draw the circuit diagram of limiter using Zener diode and explain its operation along with transfer characteristics.

- b) What is synchronized clamping circuit and explain the operation along with circuit diagram. [5+5]

OR

- 5.a) Define Clamping Circuit Theorem and explain its operation when the capacitor value is very large.

- b) List out the few differences between clipper and clamper with examples. [5+5]

- 6.a) Draw the circuit diagram of unidirectional diode AND gate with multiple control signals and explain its operation.
- b) List out and derive the different Temperature variation of Saturation Parameters of a transistor. [5+5]

OR

- 7.a) Draw and explain the circuit diagram of two-input sampling gate that avoids loading on the control signal.
- b) Explain the terms Rise time, fall time, Hold time of a transistor characteristics in detail. [5+5]

- 8.a) What is hysteresis and explain the different methods for avoiding hysteresis in Schmitt trigger in detail.
- b) Draw the circuit diagram of Emitter-coupled monostable multivibrator and explain its operation in detail. [5+5]

OR

- 9.a) Draw the circuit diagram of Transistor Bootstrap Time Base Generator and explain its operation in detail.
- b) Draw the circuit diagram of Transistor Miller Time Base generator and explain its operation. [5+5]
- 10.a) Draw the circuit diagram of Synchronization of Astable Blocking Oscillators and explain its operation.
- b) List out the few comparisons of TTL, RTL and CML logic families. [5+5]

OR

- 11.a) Explain the concept of Frequency division in Sweep Circuit along with circuit diagram.
- b) Draw and explain the block diagram of frequency divider without phase jitter. [5+5]

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R09

Code No: 54009

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, December - 2017

ELECTRONIC CIRCUITS

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

- 1.a) Compare the voltage gain, current gain, input impedance, and output impedance of transistor amplifiers with different configurations (CE, CC, CB).
- b) For the amplifier shown in figure 1, compute $A_I = I_o/I_i$, $A_{V_S} = V_o/V_{S_s}$ and R_i . Transistor h-parameters are as given in figure 1. [5+10]
- $h_{ie} = 1100 \Omega$; $h_{re} = 2.5 \times 10^{-4}$
 $h_{fe} = 50$; $h_{oe} = 25 \times 10^{-6} \text{ A/V}$.

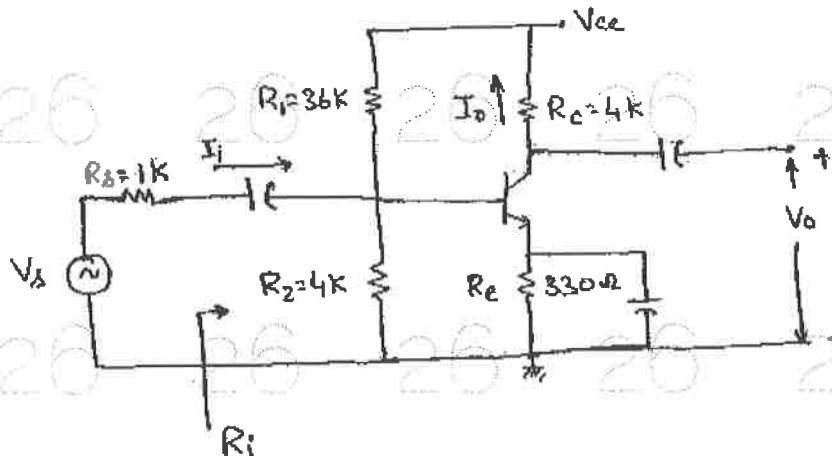


Figure: 1

- 2.a) Write about the High frequency response of BJT amplifier.
 b) Explain about the square wave testing in frequency analysis. [8+7]
- 3.a) Classify feedback amplifiers.
 b) Derive expressions for R_i and R_o of an amplifier with voltage series feedback. [5+10]
- 4.a) Show that the gain of wein bridge oscillator using BJT must be at least 3 for oscillations to occur.
 b) A crystal has $L = 2\text{H}$, $C = 0.01\text{pF}$, $R = 2\text{k}\Omega$, its mounting capacitance is 2pF . calculate series and parallel resonating frequencies. [8+7]

- 5.a) Explain why the complimentary symmetry power amplifier has become more popular in modern circuits.
- b) A series-fed class-A power amplifier shown in figure 2, uses a silicon transistor and operates from 20V DC source. If the applied sinusoidal input signal generates a peak base current of 9mA, calculate:
- DC input power
 - AC output power
 - Efficiency

[5+10]

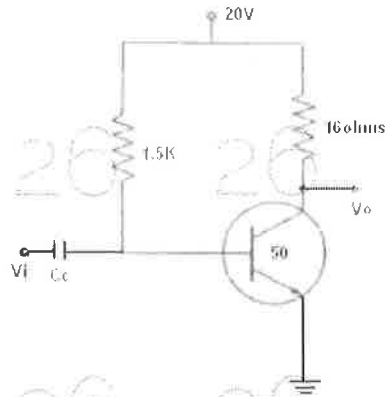


Figure: 2

- 6.a) What is Clamping operation? Explain about the clamping circuit theorem.
- b) Describe about the transfer characteristics of clampers. [7+8]
- 7.a) Explain how transistor can be used as a switch in the circuit, under what condition a transistor is said to be 'OFF' and 'ON' respectively.
- b) A germanium transistor is operated at room temperature in the CE configuration. The supply voltage is 6 V, the collector-circuit resistance is 200 Ω and the base current is 20 percent higher than the minimum value required to drive the transistor into saturation. Assume the following transistor parameters: $I_{CO} = -5\mu A$, $I_{EO} = -2\mu A$, $h_{FE} = 100$ and $r_{bb} = 250$. Find $V_{BE}(\text{Sat})$ and $V_{CE}(\text{Sat})$. [7+8]
8. Draw and explain the circuit of Monostable Multivibrator with necessary waveforms and also derive the expression for pulse width. [15]

---ooOoo---

R09

Code No: 54017

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, December - 2017

MACHINE DRAWING

(Common to ME, AME)

Time: 3 hours

Max. Marks: 75

**Answer any TWO questions from Part-A
Part-B is Compulsory**

PART-A

(30 Marks)

1. Sketch the conventional representation of the following materials:
 - a) bronze,
 - b) cast iron,
 - c) concrete,
 - d) wood and
 - e) white metal.

[15]
2. Draw:
 - a) sectional view from the front and
 - b) view from above, of the following riveted joints, to join plates of thickness 10 mm:
 - i) single riveted lap joint ii) double riveted chain lap joint iii) double riveted zig-zig lap joint.

[15]
3. Sketch the required views, indicating proportions of compression-muff coupling. [15]

PART-B

(45 Marks)

4. The details of eccentric are given in figure. Draw the following assembled views?
 - a) Half sectional front view
 - b) Top view
 - c) Side view.

All dimensions are in mm. [45]

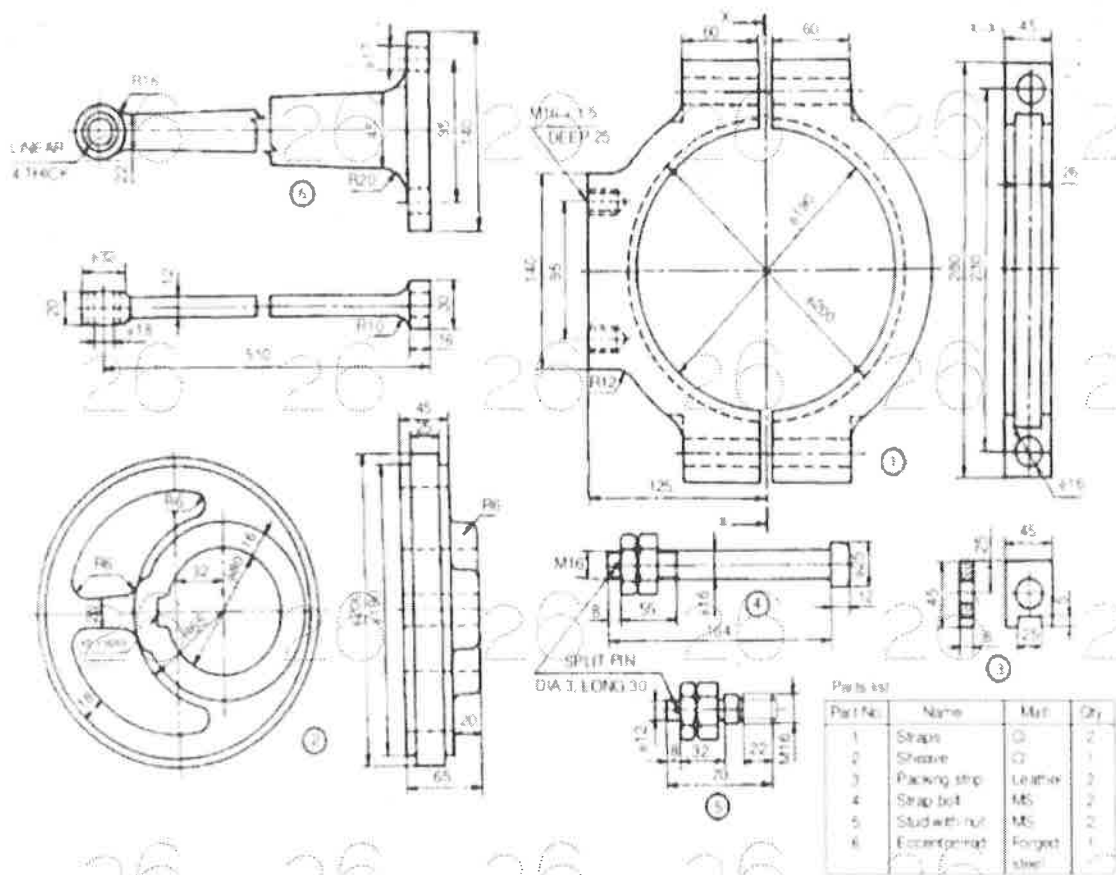


Fig 18.8b Details of an eccentric

--ooOoo--

R09

Code No: 54051

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

BIOPROCESS ENGINEERING

(Biotechnology)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Write about the outline of Bioprocess Engineering.
- b) Write about process flow sheet. [8+7]
- 2.a) Explain the procedure for material balance calculations.
- b) Define 'recycle', 'bypass' and 'purge'. [8+7]
3. In drying casein the dryer is found to consume 4 m³/h of natural gas with a calorific value of 800 kJ/mole. If the throughput of the dryer is 60 kg of wet casein per hour, drying it from 55% moisture to 10% moisture, estimate the overall thermal efficiency of the dryer taking into account the latent heat of evaporation only. Basis: 1 hour of operation. [15]
4. Write the following:
 - a) Solid state fermentation
 - b) Immobilized cell systems. [7+8]
- 5.a) Explain the use of water as an important constituent for fermentation.
- b) Describe the use of buffers for media preparation in fermentation. [7+8]
6. Determine coefficients a, b, c and d (where RQ = 0.66) along with the biomass yield Coefficient and oxygen yield coefficient for aerobic degradation of benzoic acid by a Mixed culture of microorganisms as represented by the following overall reaction
$$C_6H_5COOH + aO_2 + bNH_3 \text{ ----- } cC_5H_7NO_2 + dH_2O + eCO_2 \quad [15]$$
7. Enumerate the difference in prediction of yield coefficients in anaerobic and aerobic System with example. [15]
8. Give brief notes on structured models for growth and product formation with relevant examples. [15]

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R09

Code No: 54005

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

STRUCTURAL ANALYSIS - I
(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Explain the different types of arches with neat sketch.
- b) A circular three hinged arch of span 25m with a central rise of 5m is hinged at the crown and the end supports. It carries a point load of 100kN at 6m from the left support. Find the reactions and Draw BMD.
- i) The reaction at the supports
- ii) Moment at 5m from the left support. [7+8]
2. ABCD is a continuous beam having a span of 18 m. The left end A is fixed and simply supported at B and C. The portion CD is an overhang. The support A rotates by 0.004 rad and support B settles by 6 mm. Find the end moments using Slope Deflection Method. The span AB = BC = CD = 6 m. [15]
3. Analyze the portal frame shown in Figure 1 by MDM. Draw the B.M.D and sketch the deflected shape of the frame. [15]

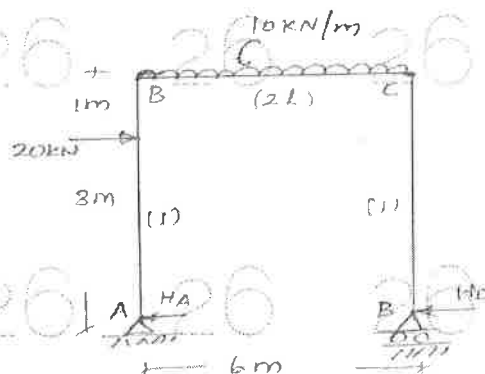


Figure: 1

4. Determine the vertical and horizontal deflection at the free end of the bent shown in figure 2 by using energy method. Assume uniform flexural rigidity EI throughout. [15]

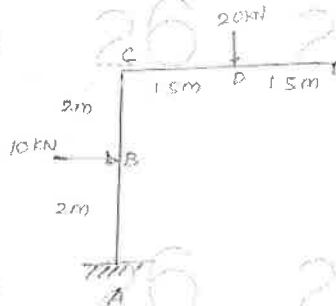


Figure: 2

5. Two point loads of 180 kN and 240kN spaced at 5m apart cross a girder of 25 m span from left to right with 180 kN leading. Construct the maximum shearing force and bending moment diagrams stating the absolute maximum values. [15]
6. Define ILD and construct a ILD for shear force and bending moment for a simply supported beam. Explain how this generated ILD can be used for calculating shear and bending moment for a simply supported beam carrying u.d.l shorter than the span. [15]
7. Analyze the pin jointed Truss shown in figure 3 by Strain Energy Method. [15]

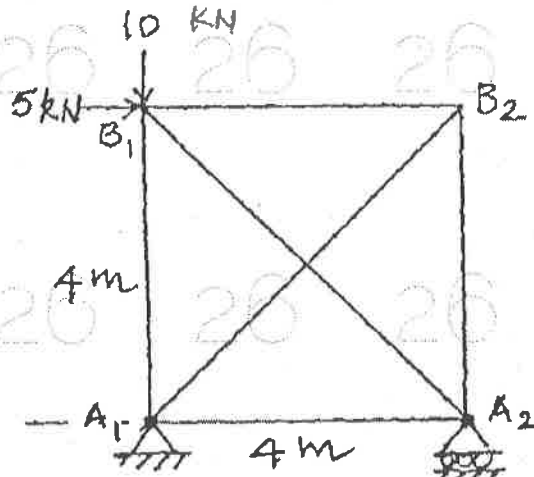


Figure: 3

8. Explain the difference between flexibility matrix method and Stiffness matrix method of Analysis. [15]

---ooOoo---

R07

Code No: T0222

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

ELECTRICAL MACHINES - II
(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 80

Answer any five questions
All questions carry equal marks

- 1.a) Enumerate and explain briefly different types of windings in transformers.
b) The no-load current of a transformer is 5.0 A at 0.3 power factor when supplied at 230-V, 50 Hz. The number of turns on the primary windings is 200. Calculate:
i) Maximum value of flux in the core
ii) The core loss
iii) The magnetizing current. [8+8]
- 2.a) Find all day efficiency of a transformer having maximum efficiency of 95% at 25 KVA at unity pf and loaded as follows:
12 hours - 2KW at 0.6 pf lag, 9 hours - 12 KW at 0.85 pf lag, 3 hours - at no load
b) How we can predetermine the efficiency and regulation of single phase transformers. [8+8]
3. The following test results were obtained for a 20kVA, 50Hz, 400/240V distribution transformer:
OC test(lv side) : 240 V, 1.066 A, 126.6 W
SC test(hv side) : 57.5 V, 8.34 A, 284 W Calculate
a) Equivalent circuit parameters when referred to hv side.
b) Efficiency of the transformer at half full - load with 0.8 power factor lagging. [8+8]
- 4.a) Describe the four possible ways of connections of 3-phase transformers with relevant Relations amongst voltages and currents on both h.v. and l.v. sides.
b) Mention the significance of Scott connection with a neat phase diagram. [8+8]
- 5.a) The frequency of stator EMF is 50 Hz for an 8-pole induction motor. If the rotor frequency is 2.5 Hz, calculate the slip and the actual speed of rotor.
b) With neat diagram explain the construction of Sq. cage IM. [8+8]
- 6.a) What is the effect of increasing rotor resistance on torque-slip characteristics of a 3-phase induction motor?
b) What is cogging? Under what condition it may happen? [8+8]
- 7.a) Explain the concept of No load test on a Induction motor.
b) Explain in detailed about circle diagram for the approximate equivalent circuit and derive the equation for leakage reactance and exciting conductance. [6+10]

26 26 26 26 26 26 26 2

8.a) Explain the construction and operation of a starter which will reduce the starting current and control the speed as well.

b) Explain the speed control of induction motor using Rotor resistance control. [8+8]

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R15

Code No: 124DF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

MECHANICS OF FLUIDS AND HYDRAULIC MACHINES

(Common to ME, MIE, MSNT)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Distinguish between cohesion and adhesion. [2]
- b) Explain absolute pressure and gauge pressure. [3]
- c) What is meant by rotational and irrotational flows? [2]
- d) Explain surface and body forces. [3]
- e) Explain critical Reynold's number as applied to boundary layer. [2]
- f) Explain HGL and TEL with the help of a figure. [3]
- g) What is a surge tank? [2]
- h) With examples. differentiate hydrostatic and hydrodynamic force. [3]
- i) What is NPSH? [2]
- j) Explain the classification of pumps. [3]

PART-B

(50 Marks)

- 2.a) Differentiate between: (i) Liquids and gases, (ii) Real fluid and ideal fluids, (iii) Specific weight and specific volume of a fluid.
- b) Determine the intensity of shear of an oil having viscosity = 1.2 poise and is used for lubrication in the clearance between a 10 cm diameter shaft and its journal bearing. The clearance is 1.0 mm and shaft rotates at 200 r.p.m. [5+5]

OR

- 3.a) What is the difference between dynamic viscosity and kinematic viscosity. State their units of measurements.
- b) Glycerin has a density of 1260 kg/cu.m and a kinematic viscosity of 0.00183 m²/sec. What shear stress is required to deform this fluid at a strain rate of 10⁴/s? [5+5]

- 4.a) Define the terms: (i) Path line (ii) Streak line (iii) Stream line, and (iv) Stream tube.
- b) Water is flowing through a pipe having diameters 30 cm and 15 cm at the bottom and upper end respectively. The intensity of pressure at the bottom end is 29.43 N/cm² and the pressure at the upper end is 14.715 N/cm². Determine the difference in datum head if the rate of flow through pipe is 50 lit/s. [5+5]

OR

- 5.a) Define the equation of continuity. Obtain an expression for continuity equation for a three dimensional flow.
- b) A 40 cm diameter pipe, conveying water, branches into two pipes of diameter 30 cm and 20 cm respectively. If the average velocity in the 40 cm diameter pipe is 3 m/s. find the discharge in this pipe. Also determine the velocity in 20 cm pipe if the average velocity in 30 cm diameter pipe is 2 m/s. [5+5]

- 6.a) Explain with the help of a neat sketch, the formation of boundary layer over a flat plate.
b) A horizontal pipe of diameter 400 mm is suddenly contracted to a diameter of 200 mm. The pressure intensities in the large and smaller pipe is given as 14.715 N/cm^2 and 12.753 N/cm^2 respectively. If $C_c = 0.62$, find the loss of head due to contraction. Also determine the rate of flow of water. [5+5]

OR

- 7.a) How is the drag and lift force caused on a body immersed in a moving fluid?
b) A pipe of diameter 300 mm and length 1000 m connects two reservoirs, having difference of water levels as 15 m. Determine the discharge through the pipe. If an additional pipe of diameter 300 mm and length 600 m is attached to the last 600 m length of the existing pipe, find the increase in the discharge. Take $f = 0.02$ and neglect minor losses. [5+5]

- 8.a) State and explain momentum equation. What are the practical applications of it?
b) A Pelton wheel is to be designed for the following specifications. Power = 735.75 kW S.P, Head = 200 m, Speed = 800 r.p.m., $\eta_o = 0.86$ and jet diameter is not to exceed one-tenth the wheel diameter. Determine: (i) Wheel diameter, (ii) The number of jets required, and (iii) Diameter of the jet. Take $C_v = 0.98$ and speed ratio = 0.45. [5+5]

OR

- 9.a) Derive an expression for the force exerted by a jet of water on an inclined fixed plate in the direction of the jet.
b) A Kaplan turbine working under a head of 25 m develops 16000 kW shaft power. The outer diameter of the runner is 4 m and hub diameter is 2 m. The guide blade angle is 35° . The hydraulic and overall efficiency are 90% and 85% respectively. If the velocity of whirl is zero at outlet, determine runner vane angles at inlet and outlet, and speed of turbine. [5+5]

- 10.a) Define a centrifugal pump. Explain the working of a single-stage centrifugal pump with sketches.
b) Find the number of pumps required to take water from a deep well under a total head of 156 m. Also the pumps are identical and are running at 1000 r.p.m. The specific speed of each pump is given as 20 while the rated capacity of each pump is 150 litre/s. [5+5]

OR

- 11.a) Differentiate between the volute casing and vortex casing for the centrifugal pump.
b) A centrifugal pump runs at 1540 rpm and discharges 120 lps against a head of 25 m. If the diameter of the impeller is 25 cm and its width is 8 cm, find the vane angle at the outer periphery. The manometric efficiency of the pump is 75%. [5+5]

---ooOoo---

R15

Code No: 124AE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

ELECTRONIC CIRCUITS

(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Classify negative feedback amplifiers. [2]
- b) Classify amplifiers. [3]
- c) Calculate the power gain in decibels if $P_o = 100$ mW, $P_i = 5$ mW. [2]
- d) Demonstrate the effect of the Miller effect capacitance. [3]
- e) Draw the transfer characteristics of positive clipper circuit. [2]
- f) Compare all types of multivibrators. [3]
- g) Give the classification of Power Amplifiers. [2]
- h) Compare and Contrast the Voltage and Power Amplifiers. [3]
- i) What is the difference between diode switch and transistor switch? [2]
- j) Illustrate the piece-wise-linear Diode characteristics. [3]

PART-B

(50 Marks)

2. Draw the circuit diagram and equivalent circuit of CB amplifier using h-parameters derive the expression for current gain, voltage gain, input resistance and output resistance. [10]

OR

3. Enumerate the effects of negative feedback on the various characteristics of the amplifier. [10]

4. Assess the effect of coupling and bypass capacitors on the low frequency response of FET amplifier. [10]

OR

5. What factors define 3-dB cutoff point at the high-frequency end of BJT amplifier? Assess their effect on high-frequency response of BJT amplifier. [10]

- 6.a) Derive the expressions for UTP and LTP of Schmitt Trigger.
- b) What is mean by triggering? Give any one triggering circuit. [6+4]

OR

- 7.a) Design the positive and negative peak clampers circuits and then explain their operation with the help of input and output waveforms.
- b) Draw the circuit diagram of an emitter-coupled clipping circuit and draw its transfer characteristics. [6+4]

8. Discuss the principle operation of Transformer coupled Class-B push pull Amplifier with the help of circuit diagram and then prove that its maximum conversion efficiency is 78.5%. [10]

OR

9.a) Describe the response of a Low-Pass RC circuit for step input with necessary equations and waveforms.

b) When high pass circuit acts as differentiator? Derive its condition. [7+3]

10.a) Explain the phenomenon of "Latching" in a transistor switch.

b) Discuss the storage and transition switch times of a diode. [4+6]

OR

11.a) Discuss the terms pertaining to Transistor Switching characteristics:

i) Rise Time ii) Delay Time iii) Turn-On Time iv) Storage Time v) fall Time and vi) Turn-Off Time.

b) Explain how transistor saturation parameters vary with temperature. [6+4]

--ooOoo--

R15

Code No: 124CW

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

ENVIRONMENTAL STUDIES

(Common to CE, ECE, CSE, EIE, IT, MCT, MMT, ETM, AME, PTM, CEE)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) Classify the characteristics of an ecosystem. [2]
- b) Differentiate Bioaccumulation and Biomagnification. [3]
- c) What is Biomass energy? [2]
- d) Write about the types of Mining. [3]
- e) What is Red Data Book? [2]
- f) Define Hotspot and write about Hotspots in India. [3]
- g) What is Bioremediation? [2]
- h) Write about Ozone depleting substances. [3]
- i) What is Crazy consumerism? [2]
- j) What are the positive and negative impacts of urban sprawl? [3]

PART-B**(50 Marks)**

2. Explain any three nutrient cycles with neat sketch. [10]
OR
3. Describe laws of energy and energy flow models with neat sketch. [10]
4. Explain the impacts of Mining on Environment and also write soil conservation methods. [10]
OR
5. What are the causes and agents responsible for soil erosion and explain the impacts related to surface and ground water? [10]
6. What are the levels of Biodiversity and explain the conservation methods of Biodiversity? [10]
OR
7. Explain the uses of Biodiversity along with threats to the biodiversity. [10]
8. Explain the air and noise pollution control methods. [10]
OR
9. Write the composition and characteristics of e-waste and its management. [10]
10. Briefly explain the Air, Water and Environmental protection Acts. [10]
OR
11. What is EIA structure and explain Environment Management Plan? [10]

---ooOoo---

R13

Code No: 114CW

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B.Tech II Year II Semester Examinations, December - 2017****ENVIRONMENTAL STUDIES****(Common to CE, ECE, CSE, EIE, IT, MCT, MMT, PTM, CEE)****Time: 3 Hours****Max. Marks: 75****Note:** This question paper contains two parts A and B:

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

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PART- A**(25 Marks)**

- 1.a) Classify the characteristics of an ecosystem. [2]
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- c) What is Biomass energy? [2]
- d) Write about the types of Mining. [3]
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- h) Write about Ozone depleting substances. [3]
- i) What is Crazy consumerism? [2]
- j) What are the positive and negative impacts of urban sprawl? [3]

PART-B**(50 Marks)**

2. Explain any three nutrient cycles with neat sketch. [10]
- OR**
3. Describe laws of energy and energy flow models with neat sketch. [10]
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- OR**
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 8. Explain the air and noise pollution control methods. [10]
- OR**
9. Write the composition and characteristics of e-waste and its management. [10]
 10. Briefly explain the Air, Water and Environmental protection Acts. [10]
- OR**
11. What is EIA structure and explain Environment Management Plan? [10]

---ooOoo---

R13

Code No: 114AE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

ELECTRONIC CIRCUITS

(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Classify negative feedback amplifiers. [2]
- b) Classify amplifiers. [3]
- c) Calculate the power gain in decibels if $P_o = 100 \text{ mW}$, $P_i = 5 \text{ mW}$. [2]
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PART-B

(50 Marks)

2. Draw the circuit diagram and equivalent circuit of CB amplifier using h-parameters derive the expression for current gain, voltage gain, input resistance and output resistance. [10]

OR

3. Enumerate the effects of negative feedback on the various characteristics of the amplifier. [10]

4. Assess the effect of coupling and bypass capacitors on the low frequency response of FET amplifier. [10]

OR

5. What factors define 3-dB cutoff point at the high-frequency end of BJT amplifier? Assess their effect on high-frequency response of BJT amplifier. [10]

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i) Rise Time ii) Delay Time iii) Turn-On Time iv) Storage Time v) Fall Time and vi) Turn-Off Time.

b) Explain how transistor saturation parameters vary with temperature. [6+4]

--ooOoo--

R13

Code No: 114DF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

MECHANICS OF FLUIDS AND HYDRAULIC MACHINES

(Common to ME, MIE, MSNT)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

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PART- A

(25 Marks)

- 1.a) Distinguish between cohesion and adhesion. [2]
- b) Explain absolute pressure and gauge pressure. [3]
- c) What is meant by rotational and irrotational flows? [2]
- d) Explain surface and body forces. [3]
- e) Explain critical Reynold's number as applied to boundary layer. [2]
- f) Explain HGL and TEL with the help of a figure. [3]
- g) What is a surge tank? [2]
- h) With examples, differentiate hydrostatic and hydrodynamic force. [3]
- i) What is NPSH? [2]
- j) Explain the classification of pumps. [3]

PART-B

(50 Marks)

- 2.a) Differentiate between: (i) Liquids and gases, (ii) Real fluid and ideal fluids, (iii) Specific weight and specific volume of a fluid.
- b) Determine the intensity of shear of an oil having viscosity = 1.2 poise and is used for lubrication in the clearance between a 10 cm diameter shaft and its journal bearing. The clearance is 1.0 mm and shaft rotates at 200 r.p.m. [5+5]

OR

- 3.a) What is the difference between dynamic viscosity and kinematic viscosity. State their units of measurements.
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- 4.a) Define the terms: (i) Path line (ii) Streak line (iii) Stream line, and (iv) Stream tube.
- b) Water is flowing through a pipe having diameters 30 cm and 15 cm at the bottom and upper end respectively. The intensity of pressure at the bottom end is 29.43 N/cm² and the pressure at the upper end is 14.715 N/cm². Determine the difference in datum head if the rate of flow through pipe is 50 lit/s. [5+5]

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- 5.a) Define the equation of continuity. Obtain an expression for continuity equation for a three dimensional flow.
- b) A 40 cm diameter pipe, conveying water, branches into two pipes of diameter 30 cm and 20 cm respectively. If the average velocity in the 40 cm diameter pipe is 3 m/s. find the discharge in this pipe. Also determine the velocity in 20 cm pipe if the average velocity in 30 cm diameter pipe is 2 m/s. [5+5]

- 6.a) Explain with the help of a neat sketch, the formation of boundary layer over a flat plate.
b) A horizontal pipe of diameter 400 mm is suddenly contracted to a diameter of 200 mm. The pressure intensities in the large and smaller pipe is given as 14.715 N/cm^2 and 12.753 N/cm^2 respectively. If $C_c = 0.62$, find the loss of head due to contraction. Also determine the rate of flow of water. [5+5]

OR

- 7.a) How is the drag and lift force caused on a body immersed in a moving fluid?
b) A pipe of diameter 300 mm and length 1000 m connects two reservoirs, having difference of water levels as 15 m. Determine the discharge through the pipe. If an additional pipe of diameter 300 mm and length 600 m is attached to the last 600 m length of the existing pipe, find the increase in the discharge. Take $f = 0.02$ and neglect minor losses. [5+5]

- 8.a) State and explain momentum equation. What are the practical applications of it?
b) A Pelton wheel is to be designed for the following specifications. Power = 735.75 kW S.P, Head = 200 m, Speed = 800 r.p.m., $\eta_o = 0.86$ and jet diameter is not to exceed one-tenth the wheel diameter. Determine: (i) Wheel diameter, (ii) The number of jets required, and (iii) Diameter of the jet. Take $C_v = 0.98$ and speed ratio = 0.45. [5+5]

OR

- 9.a) Derive an expression for the force exerted by a jet of water on an inclined fixed plate in the direction of the jet.
b) A Kaplan turbine working under a head of 25 m develops 16000 kW shaft power. The outer diameter of the runner is 4 m and hub diameter is 2 m. The guide blade angle is 35° . The hydraulic and overall efficiency are 90% and 85% respectively. If the velocity of whirl is zero at outlet, determine runner vane angles at inlet and outlet, and speed of turbine. [5+5]

- 10.a) Define a centrifugal pump. Explain the working of a single-stage centrifugal pump with sketches.
b) Find the number of pumps required to take water from a deep well under a total head of 156 m. Also the pumps are identical and are running at 1000 r.p.m. The specific speed of each pump is given as 20 while the rated capacity of each pump is 150 litre/s. [5+5]

OR

- 11.a) Differentiate between the volute casing and vortex casing for the centrifugal pump.
b) A centrifugal pump runs at 1540 rpm and discharges 120 lps against a head of 25 m. If the diameter of the impeller is 25 cm and its width is 8 cm, find the vane angle at the outer periphery. The manometric efficiency of the pump is 75%. [5+5]

---ooOoo---

R09

Code No: 54047

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

MASS TRANSFER OPERATIONS

(Biotechnology)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Ammonia gas (A) diffuses through nitrogen gas (B) under steady state conditions with nitrogen non diffusing. The total pressure is 1.013×10^5 pa and the temperature is 298 K. The diffusion path ($z_2 - z_1$) is 0.15 m. The partial pressure of NH_3 at one point is 1.5×10^4 Pa. The D_{AB} of the mixture at 1.013×10^5 pa and 298 K is $2.3 \times 10^{-5} \text{ m}^2/\text{sec}$. Calculate the flux of NH_3 .
- b) Derive Stefan's equation for the estimation of diffusion coefficient. [8+7]
- 2.a) Describe the effect of gas velocity on the mass transfer rate in fermentation broths.
- b) List various ways of expressing mass transfer coefficient with their units. [7+8]
- 3.a) A vapour mixture containing 70-mole% methanol and the rest water vapour is condensed differentially at 760 mm Hg, to condense 60% of the feed. Compute the composition of the vaporous residue and the condensate. The equilibrium data is given below:

"X"	0.1	0.2	0.4	0.6	0.8	1.0
"Y"	0.417	0.519	0.729	0.825	0.915	1.0

- b) Explain briefly about the estimation of number of stages by McCabe-Thiele Method. [8+7]
- 4.a) What are the important characteristics of a good solvent in liquid-liquid extraction?
- b) One hundred kilograms of a 50% solution of C in A (carrier) is equilibrated with 70 kg of solvent B containing 2% of C. At equilibrium, the raffinate phase has a mass of 80 kg and has 52% A and 8% B in it. What is the selectivity?
- c) Write short notes on applications of liquid-liquid extraction. [7+4+4]
- 5.a) Discuss the mechanism of leaching and the factors which will influence the rate of leaching.
- b) What is the rate of nucleation? Explain attrition and origins of crystal in crystallizers. [7+8]

6. 1400 kg (bone dry) of granular solid is to be dried under constant drying conditions from moisture content of 0.2 kg/kg of dry solid to a final moisture content of 0.02 kg/kg dry solid. The material has an effective area of $0.0615 \text{ m}^2/\text{kg}$ of solid. Under the same condition the following rates were previously known (data given below): Calculate the time required for drying.

X: 0.300 0.200 0.140 0.096 0.056 0.046 0.026 0.016

N: 1.710 1.710 1.710 1.460 1.290 0.880 0.540 0.376

Where X is kg/kg of dry solid and N is in kg/m^2 .

[15]

- 7.a) What are the six most common membrane separation processes? Give an industrial application of each one.

- b) Write the equations for calculating water flux, solute flux and rejection coefficient in reverse osmosis process. [8+7]

- 8.a) Address the problems encountered during recovery of ethanol and the requirements to overcome these difficulties.

- b) Explain briefly the extraction of penicillin using butyl acetate solvent. [10+5]

---ooOoo---

R09

Code No: 54021

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, December - 2017

PULSE AND DIGITAL CIRCUITS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Derive an condition for perfect compensation of an attenuator.
b) A 10Hz symmetrical square wave whose peak to peak amplitude is 2V is impressed upon a high pass RC circuit whose lower 3 dB frequency is 5 Hz. Calculate and sketch the output waveform for the first two cycles. What is the peak to peak output amplitude under steady state condition? [7+8]
- 2.a) With the help of a neat circuit diagram, explain the working of the two level diode clipper.
b) Calculate the steady state output voltage levels and plot the waveform which an input signal with a peak to peak value of 15V is applied to a clamping circuit. The input base level is zero level. The frequency of the input signal is 5 kHz, $C=0.1\mu\text{F}$, $R=20\text{K}\Omega$, $R_1=1\text{K}\Omega$, $R_2=500\text{K}\Omega$. Assume $T_1=T_2$. [8+7]
- 3.a) Sketch the typical transistor CE characteristics. Identify the various regions of the characteristics and show how $V_{CE}(\text{sat})$ differs with the different load resistances.
b) Discuss the switching times of the transistors. [8+7]
- 4.a) Show that the astable multivibrator can be used as a voltage to frequency converter.
b) Calculate the component values of a monostable multivibrator developing a output pulse of 500 μsec duration. Assume that $h_{FE}(\text{min})=25$, $I_C(\text{sat}) = 5\text{mA}$, $V_{CC} = 10\text{V}$ and $V_{BB} = -4\text{V}$. [8+7]
- 5.a) Explain the basic principles of the Miller's and Bootstrap time base generator.
b) Describe the methods to generate the time base waveform. [8+7]
- 6.a) Draw and explain the six diode sampling gate.
b) Discuss the reduction of pedestal in a gate circuit. [8+7]
- 7.a) Compare the sine wave synchronization and pulse synchronization.
b) Explain how a synch signal affects the frequency of operation of the sweep generator.
c) What is the condition to meet for pulse synchronization of monostable circuits? [5+5+5]
- 8.a) Explain the working of 2 input TTL NAND gate and MOS inverters.
b) Discuss the characteristics of the ECL gate. [10+5]

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R09

Code No: 54060

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

PRODUCTION TECHNOLOGY

(Common to ME, AME)

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

- 1.a) What is the purpose of draw spikes and dowel pin in casting process?
- b) Why is investment casting capable of producing fine surface details on casting?
- c) A rectangular mold with dimensions 100 mm × 200 mm × 400 mm is filled with Aluminum. Determine the final dimensions of the part as it cools to room temperature. Repeat the procedure for grey Cast Iron? Assume same aspect ratio as that of mold for the final dimensions of the part. [5+5+5]

- 2.a) Three pieces being cast have the same volume but different shapes. One is a sphere, one is cube and the other a cylinder with height equal to its diameter. Which piece will solidify the fastest and which one the slowest? Use $n=2$.
- b) Write the differences between cold and hot chamber die casting. [10+5]

- 3.a) A welding operation is performed with 20 volts, 200 amperes current and the cross section of the weld bead is 25 mm². Estimate the welding speed if the work piece and electrode are made of:
 - i) Aluminum (specific energy=2.9 J/mm³).
 - ii) Carbon Steel (specific energy=9.1 J/mm³)
 - iii) Titanium (specific energy=14.3 J/mm³). Use an efficiency of 75%.
- b) Explain the working principle of plasma arc welding with neat figure. What are the advantages of plasma arc welding? [9+6]

4. Explain how following welding defects will occur and how can we avoid or reduce?
 - a) Porosity
 - b) Slag inclusions
 - c) Incomplete fusion
 - d) Cracks
 - e) Residual stresses. [15]

5. A 250 mm wide annealed Brass 70-30 strip is rolled from a thickness of 20 mm to 12 mm for a roll radius of 300 mm and roll rpm of 100, estimate the total power required. For brass true strain is 0.5108. The coefficient of friction is 0.1. [15]

- 6.a) What is clearance in punching or blanking operation? Is it preferred to have less or more clearance? Explain.
- b) A 10 mm steel sheet is bent to a radius of 10 mm assuming that its yield stress is 205 MPa, Calculate the radius of the part after it is bent. [6+9]

7. Explain the following processes.

- a) Cogging
- b) Fullering and edging
- c) Roll forging
- d) Heading.

[15]

8.a) How many ways we can arrange polymers? Explain advantages and disadvantages of each one.

b) Match the following plastics with the applications.

[7+8]

a) acrylics	i) knobs
b) polycarbonates	ii) tanks
c) phenolics	iii) lenses
d) fiber reinforced epoxies	iv) windshield
e) poly vinyl chloride	v) helmets
f) ABS	vi) pipes
g) LDPE	vii) furniture (wood substitute)
h) polystyrenes	viii) disposable water bottle

--ooOoo--

R09

Code No: 54008

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, December - 2017

POWER SYSTEMS-I

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) What are the functions of economizer and super heater in a thermal power plants?
b) What is feed water? What are the problems due to impurities in feed water? How they can be eliminated? [8+7]
- 2.a) Explain with a simple block diagram working of a nuclear power station.
b) What are the classifications of the nuclear reactors? Describe briefly. [8+7]
- 3.a) Prove that the voltage drop diagram for a uniformly loaded distributor fed at one end is a parabola. A distributor of length L meters has a distributed load of 'i' Amps/metre. Show by means of diagrams the current loading and voltage drop at any point along its length when is fed (i) at one end (ii) at both ends (at equal potential). Also prove that maximum drop in case (ii) is only 1/4 of case (i).
b) A 2 wire DC distributor ABCDEA in the form of a ring main is fed at point 'A' at 230V and is loaded as follows: 20A at B, 40A at C, 60A at D and 20A at E. The resistances of various sections (ground and return) are AB = 0.1Ω, BC = 0.05Ω, CD = 0.01Ω, DE = 0.025Ω and EA = 0.075Ω. Determine the point of minimum potential and current in each section of distributor. [7+8]
4. The below figure shows a 1-phase line having resistance and reactance (ground and return) as 0.04 and 0.3 ohm/km. The length of section AB and BC are 1.0 km each. The voltage at the far end is 240V. Find the voltage at the sending end and the phase angle difference between the voltages of two ends, if
a) Power factors of the loads are with reference to farther end voltage
b) Power factors of the loads are with reference to the voltages at the load points. [15]



- 5.a) What is the difference between indoor and outdoor substations? What are the factors which are to be considered for a selection of a site of a substation?
b) Contrast between Air insulated substations and Gas insulated substations. [8+7]
- 6.a) What are the various methods of voltage control? Describe the booster transformer for voltage control with necessary diagram.
b) A consumer is charged at the rate of Rs.100 per annum per kVA of maximum demand plus a flat rate per kWh. The phase advancing plant can be purchased at a rate of Rs.75 per kVA. The rate of interest and depreciation on the capital is 10%. Find the most economical p.f to which it can be improved. [8+7]

- 7.a) Define the diversity factor and prove that the load factor of a supply system is improved by an increase in diversity of load.
- b) The load on a power plant on a typical day is as under:

Time	12-5 AM	5-9 AM	9-6 PM	6-10 PM	10-12 Mid Night
Load (MW)	20	40	80	100	20

Plot the chronological load curve and load duration curve. Find the load factor of the plant and energy supplied by the plant in 24 hours. [7+8]

- 8.a) What are the desirable characteristics of a tariff methods?

- b) The data of a power station as follows:

Installed capacity = 200 MW
 Capital cost = Rs. 200×10^6
 Rate of interest and depreciation = 10%
 Annual cost of fuel oil, salaries and taxation = Rs. 30×10^6
 Load factor = 0.7

Determine the cost of generation and cost of saving per kWh if the annual load factor is raised to 0.8. [7+8]

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R09

Code No: 54001

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, December - 2017

PROBABILITY AND STATISTICS

(Common to CE, CHEM, IT, PTM)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

1. a) State and prove Baye's theorem.
b) If a bank receives on the average of 3 bad cheques per day. What is the probability that it will receive i) 4 cheques per day ii) 8 bad cheques over any three consecutive days. [7+8]
2. Show that for normal distribution the quartile deviation, mean deviation and standard deviation are approximately 10:12:15. [15]
3. a) Discuss various types of alternative hypothesis with suitable example.
b) A random sample of boots worn by 40 combat soldiers in a desert region showed an average life of 1.08 years with a standard deviation of 0.05 years. Under standard conditions the boots are known to have an average life of 1.28 years. Is there reason to assert at a level of significance of 0.05 that use in the desert causes the mean life of such boots to decrease? [7+8]
4. a) Construct 95% confidence interval for the true proportion of computer literates if 47 out of 150 persons from rural areas are computer literates.
b) In a certain city 125 men in a sample of 500 were found to be smokers. In another city, the number of smokers was 375 in a random sample of 1000. Does this indicate that there is a greater population of smokers in the second city than in the first? [7+8]
5. a) Discuss various types of alternative hypothesis with suitable example.
b) The average weekly losses of man hours due to strikes in an institute before and after a disciplinary program was implemented are as follows

Before	45	73	46	124	33	57	83	34	26	17
After	36	60	44	119	35	51	77	29	24	11

Is there reason to believe that the disciplinary program is effective at 0.05 LOS. [7+8]

6. Twenty five pairs of value of variates X and Y led to the following results $N = 25$, $\sum x = 127$, $\sum y = 100$, $\sum x^2 = 760$, $\sum y^2 = 449$, $\sum xy = 500$. A subsequent scrutiny showed that two pairs of values were copied down as (8, 14) and (8, 6) instead of (8, 12) and (6, 8). Find correct value of r and correct lines of regression. [15]
7. a) Discuss basic queuing process.
b) Show that for a single service station, Poisson arrivals and exponential service time, the probability that exactly n calling units are in the queuing system is $P_n = (1-\rho)\rho^n$, $n \geq 0$, where ρ is the traffic intensity. [7+8]

8. Three boys A, B, C are throwing a ball to each other. B always throws the ball to C; C always throws the ball to A; but A is just as likely to throw the ball to C as to B. Show that the process is Markovian. Find the transition matrix and classify the states. Do all the states are ergodic? [15]

---ooOoo---

R07

Code No: V0223

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

CONTROL SYSTEMS

(Common to EEE, ECE)

Time: 3 hours

Max. Marks: 80

Answer any five questions
All questions carry equal marks

- 1.a) Discuss the mathematical modeling of fundamental components of mechanical translational system.
- b) State the effects of feedback. Distinguish between positive and negative feedback. [8+8]
- 2.a) Find transfer functions for signal flow graphs given in Figure 1.

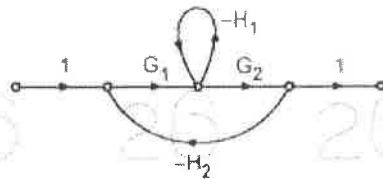


Figure: 1

- b) Obtain the transfer function of the lead network shown in the Figure 2. [8+8]

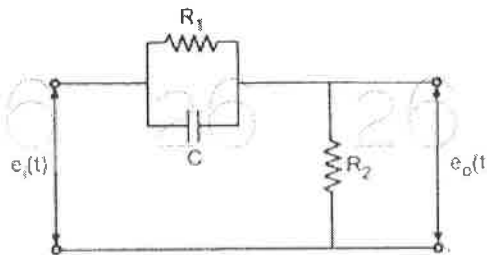


Figure: 2

- 3.a) Derive the expressions and draw the response of second order system for unit step input.
- b) What are generalized error constants? List the advantages. [8+8]
- 4.a) State the necessary and sufficient conditions of stability for first-and second-order control systems. Explain why these conditions are necessary but not sufficient for stability of higher order systems.
- b) The characteristic equation of a feedback control system is found as $s^4 + 9s^3 + 11s^2 + 6s + K = 0$. Determine the value of K for which the system is absolutely stable and marginally stable. Also determine the frequency of sustained oscillation. [8+8]
5. Plot the Bode diagram for the following transfer function and obtain the gain and phase cross over frequencies $G(s) = Ks^2 / (1+0.2s)(1+0.02s)$. Determine the value of K for a gain cross over frequency of 20 rad/sec. [16]

- 6.a) Explain the effect of addition of a pole at the origin on the polar plot of a given system.
 b) Sketch the polar plot for the following transfer function and find Gain cross over frequency, Phase cross over frequency, Gain margin and Phase margin. $G(s) = \frac{400}{s(s+2)(s+10)}$ [8+8]
- 7.a) Discuss the effect of PID controller on a second order system and derive its transfer function.
 b) List out the characteristics of a lag compensator. Write down its transfer function and also mention its applications. [10+6]
- 8.a) Define state transition matrix and mention its properties.
 b) Obtain the state equation and output equation of the electric network as shown in Figure 3. [6+10]

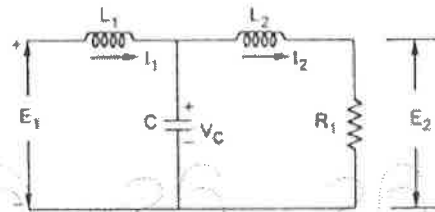


Figure: 3

---ooOoo---

R15

Code No: 224AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Pharmacy II Year II Semester Examinations, December-2017

PHARMACEUTICAL UNIT OPERATIONS-II

Time: 3hours

Max.Marks:75

Note: This question paper contains two parts A and B:
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Define the term evaporation. Give its applications. [2]
- b) What is multiple effect evaporation? Give its advantages? [3]
- c) Define critical moisture content and EMC. [2]
- d) Write the principle Involved Freeze drying. [3]
- e) What precautions are to be taken while thermolabile substance is subjected for size reduction? [2]
- f) Explain Griffith theory of size reduction. [3]
- g) List the specification and stands for sieves. [2]
- h) What are the uses of screen analysis? How it is expressed? [3]
- i) What do you mean by vortex? How it is prevents? [2]
- j) What is mixing indices? Explain. [3]

PART-B

(50 Marks)

2. Describe the construction, working and application of climbing film evaporator. [10]

OR

3. Give the construction, working and application of forced circulator evaporator. [10]

4. Write detailed note on principle, construction and working of Fluidized Bed Dryer. [10]

OR

5. Explain typical drying rate curve. [10]

6. Describe the construction, working and application of fluid energy mill. [10]

OR

7. Write a detailed note on theories of energy for comminution. [10]

8. Explain the construction, working and application of ball mill. [10]

OR

9. Write a short note on a) Type of sieves b) Mode of motion in size separation [5+5]

10. Describe the construction, working of double cone blend. [10]

OR

11. Describe the construction, working of silverson mixer. [10]

--ooOoo--

R09

Code No: R9301

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Pharmacy II Year II Semester Examinations, December - 2017

PHARMACEUTICAL UNIT OPERATIONS - II

Time: 3 hours

Max.Marks:75

**Answer any five questions
All questions carry equal marks**

- 1.a) Explain the principle of rectification. Write the role of Raoult's law in distillation.
- b) Write principle, involved in steam and flash distillation. [8+7]
- 2.a) Write the requirement of amount of steam/electrical energy in heat transfer.
- b) Write the role of boiler capacity in heat transfer. [8+7]
- 3.a) Define evaporation and explain application of evaporation.
- b) Write in detail about falling film evaporator. [8+7]
- 4.a) Define drying process. Explain in detail about steps involved in drying process with respect to drying curve.
- b) Write the theory of freeze dryer. [9+6]
- 5.a) Explain size reduction process and write laws governing energy and power requirements of a mill.
- b) Explain in detail about hammer or fluid energy mill with diagram. [9+6]
- 6.a) Write the different modes of motion in size separation.
- b) Write the theory and application of sieving used for size separation. [6+9]
- 7.a) Write the theory and application of solid-solid mixing.
- b) Write the working, construction and application of planetary mixer. [6+9]
- 8.a) Write the role of elements of computer aided manufacturing.
- b) Explain the elements and application of automatic process control. [7+8]

--ooOoo--

R15

Code No: 124DU

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

THERMAL ENGINEERING - I

(Common to ME, AME)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) List out the assumptions made for the analysis of thermodynamic air cycles. [2]
- b) Define chemical fuel. [3]
- c) What is the function of a flywheel? [2]
- d) Define octane number. [3]
- e) What is the effect of cut-off ratio on the efficiency of diesel cycle when the compression ratio is kept constant? [2]
- f) What are the functions of piston rings? [3]
- g) What is meant by positive displacement compressor? [2]
- h) What is meant by pressure coefficient? [3]
- i) Differentiate between refrigeration and air conditioning. [2]
- j) What are the properties of good refrigerants? [3]

PART - B

(50 Marks)

2. Describe with a suitable sketch the two stroke cycle spark ignition engine. How its indicator diagram differs from that of four stroke cycle engine? [10]

OR

3. Explain the essential properties of a lubricant. [10]

4. Describe the phenomenon of detonation in S.I engines. How can it be controlled? [10]

OR

5. Describe the phenomenon of auto ignition. Explain how it is responsible for knocking in S.I. engines. [10]

6. Explain the commonly used laboratory method for the measurement of air consumption. [10]

OR

7. Explain what is meant by volumetric efficiency of a compressor. Explain how clearance volume affects it. Discuss the effects of clearance upon the performance of an air compressor. [10]

8. Explain surging and choking of compressors. [10]

OR

9. Free air of $20 \text{ m}^3/\text{min}$ is compressed from 1 bar to 2.2 bar. Find: a) the I.P required if the compression carried out in roots blower, b) if the compression is carried out in vane blower. Assume that there is 25% reduction in volume before the back flow occurs and, c) the isentropic efficiency in each case. [10]

10. A refrigeration system of 10.5 tones capacity at an evaporator temperature of 12°C and a condenser temperature of 27°C is needed in a food storage locker. The refrigerant ammonia is sub cooled by 6°C before entering the expansion valve. The vapour is 0.95 dry as it leaves the evaporator coil. The compression in the compressor is of adiabatic type. Find (a) Condition of vapour at the outlet of the compressor (b) Condition of vapour at the entrance of the evaporator (c) COP and (d) The power required. Neglect valve throttling and clearance effect. [10]

OR

11. A Freon-12 refrigerator producing a cooling effect of 20 kJ/s operates on a simple vapour compression cycle with pressure limits of 1.509 bar and 9.607 bar. The vapour leaves the evaporator dry saturated and there is no under cooling. Determine the power required by the machine. [10]

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R15

Code No: 124CB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

DESIGN AND ANALYSIS OF ALGORITHMS

(Computer Science and Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(25 Marks)

- 1.a) Write about Divide and conquer general method. [2]
- b) Define any three asymptotic notations. [3]
- c) List the applications of Greed method. [2]
- d) Give an example for single source shortest Path problem. [3]
- e) Give the general method for Dynamic programming. [2]
- f) Explain about line and dead node. [3]
- g) Explain the variable method in sum of subsets. [2]
- h) State the Graph coloring problem with an example. [3]
- i) Give an example for NP-Hard Problem. [2]
- j) Differentiate Deterministic algorithms and non-deterministic algorithms. [3]

PART-B

(50 Marks)

- 2.a) Define Space Complexity. Compute space complexity for an algorithm to find factorial of a given number.
- b) Illustrate the methods to find the connected components in a graph. [5+5]

OR

- 3.a) Explain how divide and conquer method is used to implement Merge sort technique with its Time complexity.
- b) Write an algorithm for Quick sort. [5+5]
- 4.a) Write Kruskal's Algorithm.
- b) Generate the MCST for the graph given in Figure 1 by applying Kruskal's algorithm. [5+5]

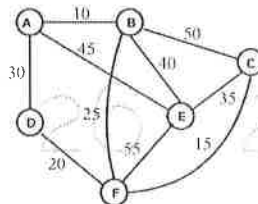


Figure: 1

OR

- 5.a) Discuss the Job sequencing with deadlines problem.
- b) Illustrate 0/1 Knapsack problem with Greed approach. [5+5]

- 6.a) Explain Multi stage graph problem.
 b) Explain the reliability design problem. [5+5]

OR

- 7.a) Explain all pairs shortest path problem with the graph given in figure 2.

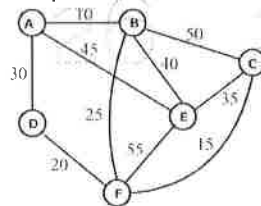


Figure: 2

- b) Write an algorithm of Optimal Binary Search Trees. [5+5]
- 8.a) Explain 4-Queen's problem.
 b) Discuss LC branch and bound solution for 0/1 Knapsack problem. [5+5]

OR

- 9.a) Illustrate the Hamilton cycles problem with backtracking method.
 b) Explain travelling sales person problem applying Branch and bound method. [5+5]
- 10.a) What is NP-Complete class? Give any two examples.
 b) Briefly explain Cooks-theorem. [5+5]

OR

- 11.a) Compare NP-Hard and NP-Complete classes.
 b) Give any two examples for non-deterministic algorithms. [5+5]

---ooOoo---

R15

Code No: 124AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

ELECTRICAL MACHINES – II
(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) Draw the vector diagram of a power transformer under full – load condition. [2]
- b) What is meant by equivalent resistance of a transformer? How may it be calculated in primary terms and secondary terms? [3]
- c) What are the various losses present in a transformer? [2]
- d) Obtain the condition for maximum efficiency of a transformer. [3]
- e) Give the applications, merits and demerits of auto transformer. [2]
- f) An auto transformer is supplying a power to a load of 3 kW, 115 V unity power factor from 230 V supply. Calculate the power supplied inductively and conductively. [3]
- g) Write the merits and demerits of slip-ring induction motor. [2]
- h) Write the effects of crawling and cogging on the performance of induction motor. [3]
- i) What is the procedure to conduct the blocked rotor test on 3- ϕ induction motor? [2]
- j) Why starting methods are needed for 3- ϕ induction motor. [3]

PART-B**(50 Marks)**

- 2.a) Discuss the effect of variation of frequency and supply voltage on losses in a transformer.
- b) A 100 kVA transformer has 400 turns on the primary and 80 turns on the secondary. The primary and secondary resistances are 0.3Ω and 0.01Ω respectively and the corresponding leakage reactance are 1.1Ω and 0.035Ω . The supply voltage is 2200V. Calculate: (i) equivalent impedance referred to primary and (ii) the voltage regulation and the secondary terminal voltage for full load having a power factor of 0.8 leading. [4+6]

OR

- 3.a) With the help of phasor diagram, explain the operation of a transformer under no load and load conditions.
- b) The core of a 100 kVA, 11000/550 V, 1-phase core type transformer has a cross-section of 400 cm^2 . Find (i) the number of HV and LV turns per phase and (ii) the e.m.f per turn if the maximum core density is not exceeding 1.3 Tesla. Assume a stacking factor of 0.9. What will happen if its primary voltage is increased by 10% on no-load? [4+6]

- 4.a) A 4400 V, 50-Hz transformer has a hysteresis loss of 1200 W, eddy current loss of 1800 W and full-load copper loss of 4000 W. If the transformer is supplied at 6600 V, 75-Hz. What will be the losses?
- b) Under what condition will there be no circulating current when two transformers are operated in parallel at no-load? [5+5]

OR

5. The following readings were obtained from O.C. and S.C. tests on 8 kVA 400/ 120V, 50-Hz transformer.

O.C. Test: (l.v. side) : 120 V; 4 A; 75 W.

S.C. Test: (h.v.side) : 9.5 V; 20 A; 110W

Obtain

- a) The equivalent circuit (approximate) constants, [26]
- b) Voltage regulation and efficiency for 0.8 lagging power factor load, and [26]
- c) The efficiency at half full – load and 0.8 power factor load. [4+3+3]
- 6.a) Explain with necessary diagrams how two 3-phase transformers can be used to convert a 3-phase supply to a 2-phase supply. If the load is balanced on one side, show that it will be balanced on other side. [26]
- b) Two single-phase furnaces working at 100V are connected to 3300-V, 3-phase mains through Scott-connected transformers. Calculate the current in each line of the 3-phase mains when the power taken by each furnace is 400-KW at a power factor of 0.8 lagging. Neglect losses in the transformer. [5+5]

OR

7. A 400 kVA load at 0.7 power factor lagging is supplied by three 'single-phase' transformers connected in Δ - Δ . Each of the Δ - Δ transformer is rated at 2000 kVA, 2300/230 V. If one defective transformer is removed from the service, calculate for the Δ - Δ connection: (a) the kVA load carried by each transformer (b) percent rated load carried by each transformer (c) total kVA rating of the transformer bank in Δ - Δ (d) ratio of V – V to Δ - Δ bank transformer ratings. [10]

- 8.a) Explain with the aid of diagrams the principal of operation of double cage induction motor. Sketch the torque –slip curves of such a motor.
- b) Obtain the relation between rotor input, rotor copper losses and rotor output in terms of slip(s). [5+5]

OR

- 9.a) Explain the principle of production of rotating magnetic field in a 3-phase induction motor.
- b) A 10 kW, 400 V, 3-phase, 4 pole, 50 Hz delta connected induction motor is running at no load with a line current of 8 A and an input power of 660 W. At full load, line current is 18 A and input power is 11.20 kW. Stator effective resistance per phase is 1.2Ω and friction, windage loss is 420 W. For negligible rotor ohmic losses at no load, calculate (i) stator core loss (ii) total rotor losses at full load (iii) total rotor ohmic losses at full load (iv) full load speed. [5+5]

10. A 3-phase, 400V induction motor gave the following test readings:

No-load: 400V, 1250W, 9A

Short-circuit: 150V, 4kW, 38A

Draw the circle diagram. If the normal rating is 20.27 hp (metric), find from the circle diagram, the full-load values of current, power factor and slip. [10]

OR

11.a) How is the speed of a 3-phase induction motor controlled by its stator voltage control?

b) A 4-pole induction motor and 6-pole induction motor are connected in cumulative cascade at 50 Hz supply. The frequency in the secondary circuit of the 6-pole motor is observed to be 1.0 Hz. Determine the slip in each machine and combined speed of the set. [6+4]

--ooOoo--

R15

Code No: 124DH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

PRINCIPLES OF ELECTRICAL ENGINEERING

(Common to ECE, ETM)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

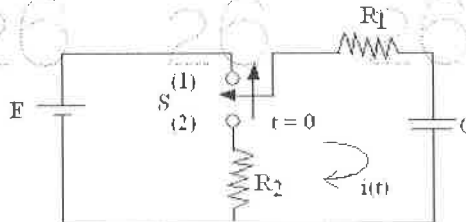
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A**(25 Marks)**

- 1.a) Distinguish between natural response and forced response of an electrical circuit. [2]
- b) Find the Laplace transform of $\{t \cdot \sin(5t + 0.2\pi)\}$ [3]
- c) Define input admittance of a one-port network and give the expression for determining it. [2]
- d) Define transmission parameters of a two-port network. [3]
- e) Distinguish between Pass band and Stop band filter. [2]
- f) Give the uses of symmetrical Attenuators. [3]
- g) Draw the Magnetization and Load Characteristics of DC Generators. [2]
- h) Draw the circuit diagram of D.C series motor. [3]
- i) A 5KVA, single phase transformer has full-load copper losses of 400W and no-load losses of 200W. Determine the load at which maximum efficiency of the transformer occurs. [2]
- j) What is the principle of working of synchro? [3]

PART -B**(50 Marks)**

2. Derive the expression for $i(t)$ when the switch is moved from position 1 to position 2 at $t=0$ in the circuit shown figure 1. The switch was in position 1 for a Long Time. Sketch the variation of $i(t)$. Also determine $V_c(t)$. [10]

**Figure: 1**
OR

3. Find i , $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$ at $t = 0^+$, if the switch is closed at $t=0$ shown in figure 2. [10]

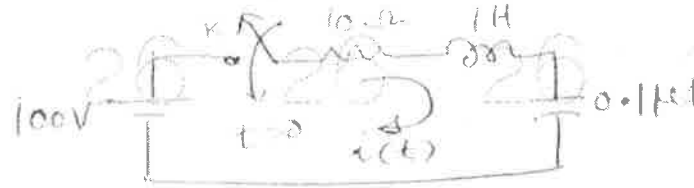


Figure: 2

- 4.a) Derive the ABCD parameters of the equivalent two-port network for two different two-port networks connected in cascade form.
 b) Obtain h-parameters of the network shown in figure 3. [5+5]

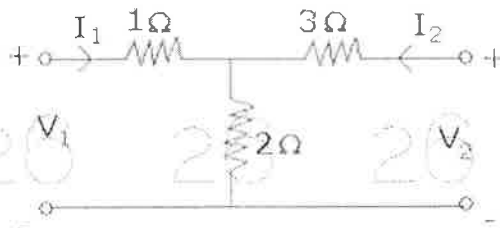


Figure: 3

OR

- 5.a) For the network shown in figure 4, determine the Z parameters.

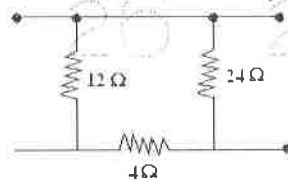


Figure: 4

- b) Write the hybrid parameter equations for a standard two-port network. Explain how they can be determined from Y and Z-parameters. [6+4]
 6.a) What is high pass filter? In what respects it is different from a low pass filter? Derive the equation to find the inductances and capacitances of a constant k high pass filter.
 b) If the ratio of R_1 and R_2 of a symmetrical T-network is $1/4$. Find the ratio of the input current to the output current. Also, calculate the attenuation in dB. [6+4]

OR

- 7.a) Define Attenuator. Explain the different types of attenuators.
 b) Draw the circuit of symmetrical Π -attenuator. Derive the design equations giving the series and shunt arm resistors in terms of:
 i) the characteristic impedance R_0 .
 ii) the current ratio N . [4+6]

- 8.a) How D.C. Generators are classified?
b) The armature of a 6-pole d.c. generator has a wave winding containing 664 conductors. Calculate the generated e.m.f. when flux per pole is 0.06Wb and the speed is 250 rpm. At what speed must the armature be driven to generate an e.m.f. of 250V if the flux per pole is reduced to 0.058Wb? [4+6]

OR

- 9.a) Explain with a neat sketch the principle of operation of a D.C. Motor.
b) A 4-pole series motor has 944 wave-connected armature conductors. At a certain load the flux per pole is 34.6mWb and the total mechanical torque developed is 209Nm. Calculate the line current taken by the motor and the speed at which it will run with an applied voltage of 500V. Total armature resistance is 3. [5+5]

- 10.a) Discuss the constructional details of single-phase transformer and hence obtain the expression for induced e. m. f. of transformer.
b) Explain how the equivalent circuit parameters can be obtained from open circuit and short circuit tests. [5+5]

OR

- 11.a) Briefly explain various losses in a transformer.
b) Calculate the effective resistance and leakage reactance of a transformer, in terms of primary which gave the following data on test with the secondary terminals, short-circuited: Applied voltage, 60V; current, 100A; Power input, 1.2kW. [5+5]

---ooOoo---

R13

Code No: 114DU

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

THERMAL ENGINEERING - I

(Mechanical Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

- 1.a) List out the assumptions made for the analysis of thermodynamic air cycles. [2]
- b) Define chemical fuel. [3]
- c) What is the function of a flywheel? [2]
- d) Define octane number. [3]
- e) What is the effect of cut-off ratio on the efficiency of diesel cycle when the compression ratio is kept constant? [2]
- f) What are the functions of piston rings? [3]
- g) What is meant by positive displacement compressor? [2]
- h) What is meant by pressure coefficient? [3]
- i) Differentiate between refrigeration and air conditioning. [2]
- j) What are the properties of good refrigerants? [3]

PART - B

(50 Marks)

2. Describe with a suitable sketch the two stroke cycle spark ignition engine. How its indicator diagram differs from that of four stroke cycle engine? [10]
- OR**
3. Explain the essential properties of a lubricant. [10]
4. Describe the phenomenon of detonation in S.I engines. How can it be controlled? [10]
- OR**
5. Describe the phenomenon of auto ignition. Explain how it is responsible for knocking in S.I. engines. [10]
6. Explain the commonly used laboratory method for the measurement of air consumption. [10]
- OR**
7. Explain what is meant by volumetric efficiency of a compressor. Explain how clearance volume affects it. Discuss the effects of clearance upon the performance of an air compressor. [10]

8. Explain surging and choking of compressors. [10]

OR

9. Free air of $20 \text{ m}^3/\text{min}$ is compressed from 1 bar to 2.2 bar. Find: a) the I.P required if the compression carried out in roots blower, b) if the compression is carried out in vane blower. Assume that there is 25% reduction in volume before the back flow occurs and, c) the isentropic efficiency in each case. [10]

10. A refrigeration system of 10.5 tones capacity at an evaporator temperature of 12°C and a condenser temperature of 27°C is needed in a food storage locker. The refrigerant ammonia is sub cooled by 6°C before entering the expansion valve. The vapour is 0.95 dry as it leaves the evaporator coil. The compression in the compressor is of adiabatic type. Find (a) Condition of vapour at the outlet of the compressor (b) Condition of vapour at the entrance of the evaporator (c) COP and (d) The power required. Neglect valve throttling and clearance effect. [10]

OR

11. A Freon-12 refrigerator producing a cooling effect of 20 kJ/s operates on a simple vapour compression cycle with pressure limits of 1.509 bar and 9.607 bar. The vapour leaves the evaporator dry saturated and there is no under cooling. Determine the power required by the machine. [10]

--ooOoo--

R13

Code No: 114CS

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

DESIGN AND ANALYSIS OF ALGORITHMS

(Computer Science and Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Write about Divide and conquer general method. [2]
- b) Define any three asymptotic notations. [3]
- c) List the applications of Greed method. [2]
- d) Give an example for single source shortest Path problem. [3]
- e) Give the general method for Dynamic programming. [2]
- f) Explain about line and dead node. [3]
- g) Explain the variable method in sum of subsets. [2]
- h) State the Graph coloring problem with an example. [3]
- i) Give an example for NP-Hard Problem. [2]
- j) Differentiate Deterministic algorithms and non-deterministic algorithms. [3]

PART-B

(50 Marks)

- 2.a) Define Space Complexity. Compute space complexity for an algorithm to find factorial of a given number.
- b) Illustrate the methods to find the connected components in a graph. [5+5]

OR

- 3.a) Explain how divide and conquer method is used to implement Merge sort technique with its Time complexity.
- b) Write an algorithm for Quick sort. [5+5]
- 4.a) Write Kruskal's Algorithm.
- b) Generate the MCST for the graph given in Figure 1 by applying Kruskal's algorithm. [5+5]

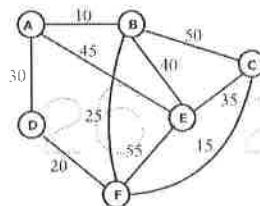


Figure: 1

OR

- 5.a) Discuss the Job sequencing with deadlines problem.
- b) Illustrate 0/1 Knapsack problem with Greed approach. [5+5]

- 6.a) Explain Multi stage graph problem.
 b) Explain the reliability design problem. [5+5]

OR

- 7.a) Explain all pairs shortest path problem with the graph given in figure 2.

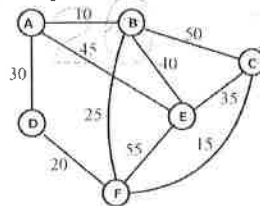


Figure: 2

- b) Write an algorithm of Optimal Binary Search Trees. [5+5]
- 8.a) Explain 4-Queen's problem.
 b) Discuss LC branch and bound solution for 0/1 Knapsack problem. [5+5]

OR

- 9.a) Illustrate the Hamilton cycles problem with backtracking method.
 b) Explain travelling sales person problem applying Branch and bound method. [5+5]
- 10.a) What is NP-Complete class? Give any two examples.
 b) Briefly explain Cooks-theorem. [5+5]

OR

- 11.a) Compare NP-Hard and NP-Complete classes.
 b) Give any two examples for non-deterministic algorithms. [5+5]

R13

Code No: 114DH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

PRINCIPLES OF ELECTRICAL ENGINEERING

(Electronics and Communication Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(25 Marks)

- 1.a) Distinguish between natural response and forced response of an electrical circuit. [2]
- b) Find the Laplace transform of $\{t \cdot \sin(5t + 0.2\pi)\}$ [3]
- c) Define input admittance of a one-port network and give the expression for determining it. [2]
- d) Define transmission parameters of a two-port network. [3]
- e) Distinguish between Pass band and Stop band filter. [2]
- f) Give the uses of symmetrical Attenuators. [3]
- g) Draw the Magnetization and Load Characteristics of DC Generators. [2]
- h) Draw the circuit diagram of D.C series motor. [3]
- i) A 5KVA, single phase transformer has full-load copper losses of 400W and no-load losses of 200W. Determine the load at which maximum efficiency of the transformer occurs. [2]
- j) What is the principle of working of synchro? [3]

PART-B

(50 Marks)

2. Derive the expression for $i(t)$ when the switch is moved from position 1 to position 2 at $t=0$ in the circuit shown figure 1. The switch was in position 1 for a Long Time. Sketch the variation of $i(t)$. Also determine $V_C(t)$. [10]

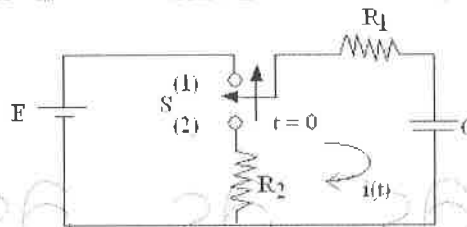


Figure: 1

OR

3. Find i , $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$ at $t = 0^+$, if the switch is closed at $t=0$ shown in figure 2. [10]

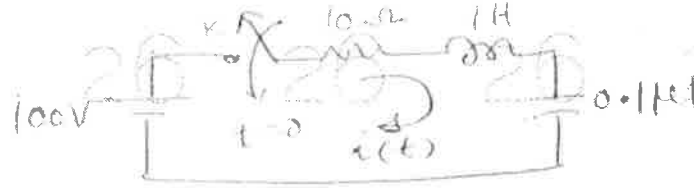


Figure: 2

- 4.a) Derive the ABCD parameters of the equivalent two-port network for two different two-port networks connected in cascade form.
 b) Obtain h-parameters of the network shown in figure 3. [5+5]

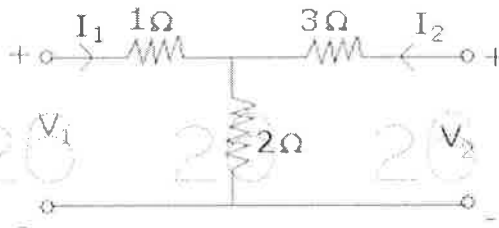


Figure: 3

OR

- 5.a) For the network shown in figure 4, determine the Z parameters.

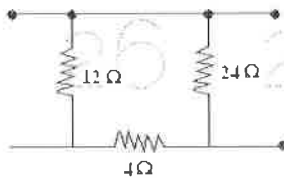


Figure: 4

- b) Write the hybrid parameter equations for a standard two-port network. Explain how they can be determined from Y and Z -parameters. [6+4]

- 6.a) What is high pass filter? In what respects it is different from a low pass filter? Derive the equation to find the inductances and capacitances of a constant k high pass filter.
 b) If the ratio of R_1 and R_2 of a symmetrical T-network is $1/4$. Find the ratio of the input current to the output current. Also, calculate the attenuation in dB. [6+4]

OR

- 7.a) Define Attenuator. Explain the different types of attenuators.
 b) Draw the circuit of symmetrical Π -attenuator. Derive the design equations giving the series and shunt arm resistors in terms of:
 i) the characteristic impedance R_0 .
 ii) the current ratio N . [4+6]

- 8.a) How D.C. Generators are classified?
b) The armature of a 6-pole d.c. generator has a wave winding containing 664 conductors. Calculate the generated e.m.f. when flux per pole is 0.06Wb and the speed is 250 rpm. At what speed must the armature be driven to generate an e.m.f. of 250V if the flux per pole is reduced to 0.058Wb? [4+6]

OR

- 9.a) Explain with a neat sketch the principle of operation of a D.C. Motor.
b) A 4-pole series motor has 944 wave-connected armature conductors. At a certain load the flux per pole is 34.6mWb and the total mechanical torque developed is 209Nm. Calculate the line current taken by the motor and the speed at which it will run with an applied voltage of 500V. Total armature resistance is 3. [5+5]
- 10.a) Discuss the constructional details of single-phase transformer and hence obtain the expression for induced e. m. f. of transformer.
b) Explain how the equivalent circuit parameters can be obtained from open circuit and short circuit tests. [5+5]

OR

- 11.a) Briefly explain various losses in a transformer.
b) Calculate the effective resistance and leakage reactance of a transformer, in terms of primary which gave the following data on test with the secondary terminals, short-circuited: Applied voltage, 60V; current, 100A; Power input, 1.2kW. [5+5]

---ooOoo---

R13

Code No: 114DK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

PROBABILITY AND STATISTICS

(Common to CE, CEE)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(25 Marks)

1.a) Find the first two moments about origin from Moment generating function of the Binomial distribution? [2]

b) A random variable X has the following probability function:

x	0	1	2	3	4	5	6	7
P(x)	0	k	2k	2k	3k	k ²	2k ²	7k ² + k

Determine (i) k (ii) P(x < 6) (iii) P(0 < x < 5). [3]

c) Show that the coefficient of correlation lies between -1 and 1. [2]

d) If E(X) = 5, E(Y) = 15, $\sigma_X = \sigma_Y = 2.58$ and correlation coefficient is 0.93, find the regression lines of X on Y and Y on X and also determine regression coefficients. [3]

e) A population consists of five members 2,3,6,8,11. Consider all possible samples of size 2 that can be drawn with replacement from this population. Find (i) the mean of the population (ii) the standard deviation of the population. [2]

f) Write about (i) Critical Region (ii) Left tailed test (iii) Right tailed test. [3]

g) Write any two characteristics of queuing model (M/M/1):(∞ /FIFO). [2]

h) Explain the different elements of queuing system. [3]

i) Calculate the probability of ruin and expected duration of the game, when $a = 50, z = 40, p = 0.5$ [2]

j)
$$\begin{bmatrix} \frac{1}{2} & \frac{1}{2} & 0 \\ \frac{1}{2} & \frac{1}{2} & 0 \\ \frac{1}{4} & \frac{1}{4} & \frac{1}{2} \end{bmatrix}$$
 is the Stochastic matrix regular? [3]

PART-B

(50 Marks)

2.a) 20% of items produced from a factory are defective. Find the probability that in a sample of 5 chosen at random i) none is defective ii) one is defective and iii) $p(1 < x < 4)$.

b) If x is a Poisson Variate such that $3 p(x = 4) = \frac{1}{2} p(x = 2) + p(x = 0)$, find:

i) mean of x ii) $p(x \leq 2)$. [5+5]

OR

3. Prove that mean, median and mode of a normal distribution coincide. [10]

4. The joint probability density function is given by:

$$f(x, y) = \begin{cases} 10xy^2, & 0 < x < y < 1 \\ 0, & \text{elsewhere} \end{cases}$$

Find:

- Marginal probability density function for X
- Marginal probability density function for Y
- Conditional probability density function of X given Y
- Conditional probability density function of Y given X.

[10]

OR

5.a) Calculate the coefficient of rank correlation from the below data.

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

b) Find the regression line of x on y and y on x for the following data. [5+5]

X	1	2	3	4	5
Y	15	25	35	45	55

6.a) An ambulance service claims that it takes on average less than 10 minutes to reach its destination in emergency calls. A sample of 36 calls has a mean of 11 minutes and the variance of 16 minutes. Test the significance at 0.05 level.

b) A die is thrown 264 times with the following results. Show that the die is biased. [5+5]

No. Appeared on the die	1	2	3	4	5	6
Frequency	40	32	28	58	54	52

OR

7. The nicotine contents in milligrams in two samples of tobacco were found to be as follows:

Sample A	24	27	26	21	25	-
Sample B	27	30	28	31	22	36

Can it be said that two samples came from same normal population. [10]

8. Dr. Raju's outpatient clinic can accommodate six people only in the waiting hall. The patients who arrive when the hall is full walk away. The patients arrive in a Poisson at an average rate of 3 per hour and spent on an average of 15 minutes in doctor's chamber which is exponentially distributed. Find:

- The probability that a patient can directly in to the doctor's chamber upon his arrival
- Find expected no. of customers waiting for treatment
- Find effective arrival rate
- Find the time if patient can expected to spent in clinic.

[10]

OR

9. A toll gate is operated on a frequency where cars arrive according to a Poisson distribution with mean frequency of 1.2 cars per minute. The time of completing payment follows an exponential distribution with mean of 20 seconds. Find:
- the idle time of the counter
 - average number of cars in the system
 - average number of cars in the queue
 - average time that a car spends in the system
 - average time that a car spends in the queue.

[10]

- 10.a) Define Markov chain, regular, ergodic and Stochastic matrices?
 b) Check whether the following markov chain is regular and ergodic?

[5+5]

$$P = \begin{bmatrix} 0 & 0.5 & 0.5 & 0 \\ 0.5 & 0 & 0 & 0.5 \\ 0.5 & 0 & 0 & 0.5 \\ 0 & 0.5 & 0.5 & 0.5 \end{bmatrix}$$

OR

- 11.a) What do you mean by stochastic process and explain the types of stochastic processes?
 b) The three state Markov chain is given by the transition probability matrix

$$P = \begin{bmatrix} 0 & \frac{2}{3} & \frac{1}{3} \\ \frac{1}{2} & 0 & \frac{1}{2} \\ \frac{1}{2} & \frac{1}{2} & 0 \end{bmatrix}$$

Prove that the chain is irreducible.

[5+5]

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R13

Code No: 114AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

ELECTRICAL MACHINES – II
(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) Draw the vector diagram of a power transformer under full – load condition. [2]
- b) What is meant by equivalent resistance of a transformer? How may it be calculated in primary terms and secondary terms? [3]
- c) What are the various losses present in a transformer? [2]
- d) Obtain the condition for maximum efficiency of a transformer. [3]
- e) Give the applications, merits and demerits of auto transformer. [2]
- f) An auto transformer is supplying a power to a load of 3 kW, 115 V unity power factor from 230 V supply. Calculate the power supplied inductively and conductively. [3]
- g) Write the merits and demerits of slip-ring induction motor. [2]
- h) Write the effects of crawling and cogging on the performance of induction motor. [3]
- i) What is the procedure to conduct the blocked rotor test on 3- ϕ induction motor? [2]
- j) Why starting methods are needed for 3- ϕ induction motor. [3]

PART-B**(50 Marks)**

- 2.a) Discuss the effect of variation of frequency and supply voltage on losses in a transformer.
- b) A 100 kVA transformer has 400 turns on the primary and 80 turns on the secondary. The primary and secondary resistances are 0.3Ω and 0.01Ω respectively and the corresponding leakage reactance are 1.1Ω and 0.035Ω . The supply voltage is 2200V. Calculate: (i) equivalent impedance referred to primary and (ii) the voltage regulation and the secondary terminal voltage for full-load having a power factor of 0.8 leading. [4+6]

OR

- 3.a) With the help of phasor diagram, explain the operation of a transformer under no load and load conditions.
- b) The core of a 100 kVA, 11000/550 V, 1-phase core type transformer has a cross-section of 400 cm^2 . Find (i) the number of HV and LV turns per phase and (ii) the e.m.f per turn if the maximum core density is not exceeding 1.3 Tesla. Assume a stacking factor of 0.9. What will happen if its primary voltage is increased by 10% on no-load? [4+6]

4.a) A 4400 V, 50-Hz transformer has a hysteresis loss of 1200 W, eddy current loss of 1800 W and full-load copper loss of 4000 W. If the transformer is supplied at 6600 V, 75-Hz. What will be the losses?

b) Under what condition will there be no circulating current when two transformers are operated in parallel at no-load? [5+5]

OR

5. The following readings were obtained from O.C. and S.C. tests on 8 kVA 400/ 120V, 50-Hz transformer.

O.C. Test: (l.v. side) : 120 V; 4 A; 75 W.

S.C. Test: (h.v. side) : 9.5 V; 20 A; 110W

Obtain

a) The equivalent circuit (approximate) constants,

b) Voltage regulation and efficiency for 0.8 lagging power factor load, and

c) The efficiency at half full – load and 0.8 power factor load. [4+3+3]

6.a) Explain with necessary diagrams how two 3-phase transformers can be used to convert a 3-phase supply to a 2-phase supply. If the load is balanced on one side, show that it will be balanced on other side.

b) Two single-phase furnaces working at 100V are connected to 3300-V, 3-phase mains through Scott-connected transformers. Calculate the current in each line of the 3-phase mains when the power taken by each furnace is 400-KW at a power factor of 0.8 lagging. Neglect losses in the transformer. [5+5]

OR

7. A 400 kVA load at 0.7 power factor lagging is supplied by three 'single-phase' transformers connected in Δ - Δ . Each of the Δ - Δ transformer is rated at 2000 kVA, 2300/230 V. If one defective transformer is removed from the service, calculate for the Δ - Δ connection: (a) the kVA load carried by each transformer (b) percent rated load carried by each transformer (c) total kVA rating of the transformer bank in Δ - Δ (d) ratio of V – V to Δ - Δ bank transformer ratings. [10]

8.a) Explain with the aid of diagrams the principal of operation of double cage induction motor. Sketch the torque –slip curves of such a motor.

b) Obtain the relation between rotor input, rotor copper losses and rotor output in terms of slip (s). [5+5]

OR

9.a) Explain the principle of production of rotating magnetic field in a 3-phase induction motor.

b) A 10 kW, 400 V, 3-phase, 4 pole, 50 Hz delta connected induction motor is running at no load with a line current of 8 A and an input power of 660 W. At full load, line current is 18 A and input power is 11.20 kW. Stator effective resistance per phase is 1.2 Ω and friction, windage loss is 420 W. For negligible rotor ohmic losses at no load, calculate (i) stator core loss (ii) total rotor losses at full load (iii) total rotor ohmic losses at full load (iv) full load speed. [5+5]

10. A 3-phase, 400V induction motor gave the following test readings:

No-load: 400V, 1250W, 9A

Short-circuit: 150V, 4kW, 38A

Draw the circle diagram. If the normal rating is 20.27 hp (metric), find from the circle diagram, the full-load values of current, power factor and slip. [10]

OR

11.a) How is the speed of a 3-phase induction motor controlled by its stator voltage control?

b) A 4-pole induction motor and 6-pole induction motor are connected in cumulative cascade at 50 Hz supply. The frequency in the secondary circuit of the 6-pole motor is observed to be 1.0 Hz. Determine the slip in each machine and combined speed of the set. [6+4]

R09

Code No: 54020

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, December - 2017

ELECTRONIC CIRCUIT ANALYSIS

(Common to ECE, EIE)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) With necessary expressions, discuss the variations of A_v , A_i , R_i , R_o , A_p with R_s and R_L in common collector configuration.
- b) Consider a single stage CE amplifier with $R_s = 1K\Omega$, $R_c = 50 K$, $R_2 = 2K$, $R_c = 1K$, $R_L = 1.2K$, $h_{fe} = 50$, $h_{oe} = h_{re} = 0$, $h_{ie} = 1.1K$. Find A_i , R_o , A_v and power gain. [7+8]
- 2.a) Perform the analysis of Cascode Amplifier circuit.
- b) Draw and explain the working of a two stage RC Coupled amplifier. Derive the expression for voltage gain. [8+7]
- 3.a) Derive the expression for Hybrid- π conductance in terms of low frequency h-parameters.
- b) Following measurements of a certain transistor are available at room temperature and with $I_c = 5$ mA, $h_{fe} = 100$, $h_{ie} = 0.62 K\Omega$. Short circuit current gain $= A_{is} = 10$ at 10MHz. $C_{bc} = 3_{pF}$. Calculate f_T and f_{β} . [10+5]
- 4.a) When 2-stages of identical amplifiers are cascaded, obtain the expressions for overall voltage gain, current gain and power gain.
- b) With neat sketch explain Common-source amplifier with Resistive load and then derive the expressions for A_v , Z_i , and Z_o . [7+8]
- 5.a) Draw the circuit of a feedback pair with voltage series topology and find the voltage gain.
- b) The open-loop gain of an amplifier changes by 20% due to changes in the parameters of the amplifying device. If a change of gain by 2% is allowed, find the minimum value of feedback ratio and open-loop gain, if the amplifier gain with feedback is 10. [10+5]
- 6.a) Draw the circuit diagram of a RC phases shift oscillator using BJT. Derive the expression for frequency of oscillation.
- b) Why RC oscillator are not suitable for high frequency applications. [10+5]
- 7.a) Derive the expression for maximum value of conversion efficiency of class A power amplifier.
- b) Discuss about Heat Sinks. [9+6]
- 8.a) In a single tuned amplifier, the circuit bandwidth is 5KHz, and the voltage gain has maximum at 1000KHz, when the tuning capacitor is adjusted to 500pF. Calculate the Q of the circuit and the coil inductance.
- b) What is stagger tuning? How it is different from synchronous tuning? Derive an expression for the selectivity of a stagger tuned amplifier. [5+10]

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R09

Code No: 54014

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

KINEMATICS OF MACHINERY

(Common to ME, AME)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) What do you mean by degree of freedom of a kinematic pair? How are pairs classified? Give examples.
- b) The mechanism, as shown in figure-1, is a four bar kinematic chain of which the centres A and B are fixed. The lengths are:
 $AB = 600$ mm, $AC = BD = CD = 300$ mm. Find the point G on the centre line of the cross arm of which the locus is an approximately straight line even for considerable displacements from the position. [7+8]

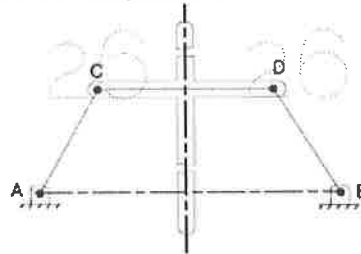


Figure: 1

- 2.a) Sketch and explain any two inversions of a double slider crank chain.
- b) Sketch a pantograph, explain its working and show that it can be used to reproduce to an enlarged scale a given figure. [7+8]
- 3.a) Locate all the instantaneous centers of the slider crank mechanism as shown in figure 2. The lengths of crank OB and connecting rod AB are 100 mm and 400 mm respectively. If the crank rotates clockwise with an angular velocity of 10 rad/s. Find (i) Velocity of the slider A, and (ii) Angular velocity of the connecting rod AB.

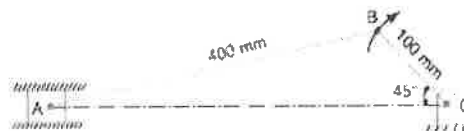


Figure: 2

- b) Derive an expression for the magnitude and direction of coriolis component of acceleration. [8+7]

- 4.a) Four bar mechanism has the following dimensions:
 DA = 300 mm; CB = AB = 360 mm; DC = 600 mm. The link DC is fixed and the angle ADC is 60° . The driving link DA rotates uniformly at a speed of 100 r.p.m. clockwise and the constant driving torque has the magnitude of 50 N-m. Determine the velocity of the point B and angular velocity of the driven link CB. Also find the actual mechanical advantage and the resisting torque if the efficiency of the mechanism is 70 %.
- b) Explain why two Hooke's joints are used to transmit motion from the engine to the differential of an automobile. [8+7]
5. A cam consists of a circular disc of diameter 75 mm with its centre displaced 25 mm from the camshaft axis. The follower has a flat surface (horizontal) in contact with the cam and the line of action of the follower is vertical and passes through the shaft axis as shown in figure 3. The mass of the follower is 2.3 kg and is pressed downwards by a spring which has a stiffness of 3.5 N/mm. In the lowest position the spring force is 45 N. (a) Derive an expression for the acceleration of the follower in terms of the angle of rotation from the beginning of the lift. (b) As the cam shaft speed is gradually increased, a value is reached at which the follower begins to lift from the cam surface. Determine the camshaft speed for this condition. [15]

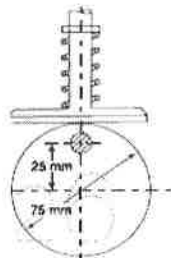


Figure: 3

6. Two mating gears have 20 and 40 involute teeth of module 10 mm and 20° pressure angle. The addendum on each wheel is to be made of such a length that the line of contact on each side of the pitch point has half the maximum possible length. Determine the addendum height for each gear wheel, length of the path of contact, arc of contact and contact ratio. [15]
- 7.a) Obtain an expression for the length of a chain.
 b) Derive an expression for the ratio of the driving tensions in a rope drive assuming the angle of the groove of the pulley to be as 2β . [7+8]

- 8.a) Two shafts A and B are co-axial. A gear C (50 teeth) is rigidly mounted on shaft A. A compound gear D-E gears with C and an internal gear G. D has 20 teeth and gears with C and E has 35 teeth and gears with an internal gear G. The gear G is fixed and is concentric with the shaft axis. The compound gear D-E is mounted on a pin which projects from an arm keyed to the shaft B. Sketch the arrangement and find the number of teeth on internal gear G assuming that all gears have the same module. If the shaft A rotates at 110 r.p.m., find the speed of shaft B.
- b) An epicyclic gear train consists of a sun wheel S, a stationary internal gear E and three identical planet wheels P carried on a star-shaped planet carrier C. The size of different toothed wheels are such that the planet carrier C rotates at $\frac{1}{5}$ th of the speed of the sun wheel S. The minimum number of teeth on any wheel is 16. The driving torque on the sun wheel is 100 N-m. Determine : (i) Number of teeth on different wheels of the train, and (ii) Torque necessary to keep the internal gear stationary. [8+7]

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R15

Code No: 224AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Pharmacy II Year II Semester Examinations, December-2017

PHARMACEUTICAL BIOCHEMISTRY

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A (25 Marks)

- 1.a) Define Gibb's free energy and importance of each term in it? [2]
- b) Write short note on osmoregulation? [3]
- c) What are co-enzymes and write functions? [2]
- d) What is Michaelis-Menton constant and write its importance? [3]
- e) What are carbohydrates and classify? [2]
- f) Give the compounds present at equilibrium when pure aldolase acts on a mixture of fructose 1,6 diphosphate, d-glyceraldehyde and acetaldehyde? [3]
- g) What are essential amino acids? [2]
- h) Write a note on deamination of proteins? [3]
- i) Write about synthesis of ketone bodies? [2]
- j) What are the end products of fatty acid oxidation? [3]

PART-B (50 Marks)

- 2.a) Discuss about energy rich compounds and reduction potential? [5+5]
 - b) Write the production of ATP and its biological significance? [5+5]
- OR**
3. Write about active and passive transport process with its significance? [10]
 4. Discuss role of an enzyme in biochemical process and mention its applications? [10]
- OR**
5. Write about activators and deactivators of enzymes with examples? [10]
 - 6.a) Write brief account of glycolysis? [5+5]
 - b) Write note on Gluconeogenesis? [5+5]
- OR**
7. Describe citric acid cycle in aerobic organisms and release of stored energy? [10]
 - 8.a) Explain the mechanism of protein synthesis? [5+5]
 - b) Write urea cycle with emphasis on hydrolysis of ATP in each step? [5+5]
- OR**
9. Describe the general metabolic pathways of amino acids. [10]
 - 10.a) Write in detail about bio-synthesis of fatty acids? [5+5]
 - b) Write in detail about metabolism of cholesterol? [5+5]
- OR**
11. Discuss the biosynthesis of purine nucleotides? [10]

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