

Code No: 117CZ

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, November/December - 2017

EMBEDDED SYSTEM DESIGN

(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) List the characteristics of an embedded system. [2]
- b) What is the difference between a system and an embedded system? [3]
- c) What is actuator? [2]
- d) What are the considerations for processor selection? [3]
- e) Explain the role of reset circuit in an embedded system. [2]
- f) What is the difference between real time clock and watchdog time. [3]
- g) When do you use cooperative scheduling? [2]
- h) What is the function of timer in RTOS? [3]
- i) What is Remote Procedure Call and explain its working? [2]
- j) What is meant by concurrency of task execution in real time system? [3]

PART-B

(50 Marks)

- 2.a) Explain the major application areas of embedded systems.
 - b) What are the components of Embedded System Hardware? [5+5]
- OR**
3. Discuss the purpose of embedded systems. List the design metrics used to compare them. [10]
 4. With a neat diagram, explain the architecture of a general purpose processor. [10]
- OR**
- 5.a) Write the difference between general purpose processors and domain specific processors.
 - b) Discuss the aspects of memory allocation and mapping in embedded domain. [5+5]
 - 6.a) What are the design criteria of external brown-out protection circuit.
 - b) How to design and implement firmware for embedded systems? [5+5]
- OR**
7. Explain with one example, how to change the bus frequency of the processor. [10]

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- 8.a) How do we initiate round robin time series scheduling?
- b) How lower priority task executes in a preemptive scheduler?

[5+5]

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OR

- 9. Write the basic design principles when using an RTOS to design of sample RTOS.[10]

- 10. Explain in detail the following device drivers
 - a) Serial port device driver
 - b) Device drivers for internal programmable timing devices.

[5+5]

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OR

- 11.a) Explain the inter task communication offered by RTOS.
- b) Explain message-passing communication system in detail.

[5+5]

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PART-B

(50 Marks)

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 - b) What are the components of Embedded System Hardware? [5+5]
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b) Device drivers for internal programmable timing devices. [5+5]

OR

11.a) Explain the inter task communication offered by RTOS.

- b) Explain message-passing communication system in detail. [5+5]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, March - 2017

EMBEDDED SYSTEMS DESIGN

(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) Define Embedded System. [2]
- b) List out the differences between an embedded system and a general purpose computer. [3]
- c) Explain the concept of Memory Shadowing. [2]
- d) Write a short note on COTS. [3]
- e) What is the use of reset circuit in an embedded system? [2]
- f) Briefly explain Brown-out protection circuit. [3]
- g) What is the use of RTOS in Embedded System Design? [2]
- h) Discuss briefly about Task Scheduling. [3]
- i) What are the considerations to choose an RTOS? [2]
- j) Discuss the issues in Task Synchronization briefly. [3]

Part-B (50 Marks)

2. Explain in detail the classification of embedded system. [10]
- OR**
- 3.a) Describe the characteristics of an embedded system in detail.
 - b) Explain the quality attribute portability and reliability in embedded system design context. [5+5]
- 4.a) What are the different types of memories used in embedded system design? Explain each with examples.
 - b) Explain the role of sensors in embedded system design. [5+5]
- OR**
5. Explain the different communication interfaces with respect to embedded systems. [10]
- 6.a) Describe the purpose of a Real Time Clock in an embedded system, explain in detail.
 - b) Explain the function of Watchdog timer in an embedded system. [5+5]
- OR**
7. What is the need of an embedded firmware? Briefly explain the embedded firmware development languages. [10]

8. What is a process? With a neat representation explain the process states and state transition. [10]

OR

9. Explain the different thread binding models for user and kernel level threads. [10]

10.a) Explain message passing technique for inter process communication in detail.

b) Explain the concept of Shared memory in task communication. [5+5]

OR

11. What is a device driver? Explain the role of device driver in an embedded OS. [10]

Code No: 117CZ**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech IV Year I Semester Examinations, November/December - 2016****EMBEDDED SYSTEM DESIGN****(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) Define "Time-to-market". [2]
- b) What is the quality attribute "Portability" in the embedded system design context. [3]
- c) What is the role of ASIC in Embedded System design? [2]
- d) What is Actuator? [3]
- e) What is the role of Reset Circuit in embedded system? [2]
- f) What are the merits and drawbacks of 'recursion'? [3]
- g) What is an Operating system? What are its primary functions? [2]
- h) What is task control block (TCB)? [3]
- i) Define Coffman conditions. [2]
- j) How multiple threads of a process co-operate? [3]

PART-B**(50 Marks)**

2. Define an embedded system? Explain the characteristics of Embedded Systems. [10]

OR

3. Explain the various purposes of embedded systems in detail with illustrative examples. [10]

- 4.a) Explain the different factors that needs to be considered in the selection of memory for embedded systems.
- b) Explain the difference between I²C and SPI communication interface. [5+5]

OR

5. Explain the different communication buses used in automotive application. [10]

6. Explain the different sections of a memory segment allocated to an application by the memory manager. [10]

OR

7. Explain the difference between 'pointer to constant data' and 'constant pointer to data' in Embedded C programming. Explain the syntax for declaring both. [10]

8.a) Explain starvation in the process scheduling context. Explain how starvation can be effectively tackled.

b) What is the difference between a General Purpose kernel and Real-Time kernel? Give an example for both. [5+5]

OR

9. Explain the different multitasking models in the operating system context. [10]

10. Explain in detail, the different task communication synchronization issues encountered in Inter Process communication. [10]

OR

11. Explain the architecture of device driver, with neat sketch and give the applications of device drivers. [10]

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