

Code No: **R164104D**

R16

Set No. 1

IV B.Tech I Semester Regular/Supplementary Examinations, March - 2021

EMBEDDED SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any FOUR questions from Part-B

PART-A (14 Marks)

1. a) Write short notes on large scale embedded systems. [3]
- b) Define watchdog timer. List the applications. [3]
- c) What is Assembly language programming? [2]
- d) List different types of RTOS? Explain any one. [2]
- e) Define and Explain boundary scan. [2]
- f) What are Laboratory Tools? [2]

PART-B (4x14 = 56 Marks)

2. a) Explain the different classifications of Embedded Systems. Give an example for each. [7]
- b) What is Actuator? Explain its role in Embedded System Design? Illustrate with an example. [7]
3. a) Explain the sequence of operations for communicating with an I²c slave device. [7]
- b) Explain the purpose of (i) Counting Device and (ii) Real Time Clock in an embedded system. [7]
4. a) What is Device driver? Explain about device driver programming. [7]
- b) List out the differences between an architecture specific device driver and a generic device driver. [7]
5. a) Explain how thread and process are used in an embedded system. [7]
- b) Differentiate between Hardware and Software Co-Design with all the salient features of them. [7]
6. a) What is a monitor program? Explain role in embedded firmware debugging. [7]
- b) Explain the advantages and limitations of simulator based debugging. [7]
7. a) Explain at least four models that are used for testing an Embedded System. [7]
- b) Write short notes on Translation Tools. [7]

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1. a) What is embedded system? Explain it. [3]
- b) Explain the operation of transistor based relay driver circuit. [3]
- c) What is macro in embedded C. [2]
- d) What is ICE? Explain it. [2]
- e) What are the limitations of simulator base debugging? [2]
- f) What are the various simulators used for Embedded system testing. [2]

PART-B (4x14 = 56 Marks)

2. a) What are the different types of memories used in Embedded System design? Explain the role of each. [7]
- b) Explain the difference between Embedded Systems and General Computing Systems. [7]
3. a) Explain the role of Watchdog timer in embedded system. [7]
- b) Compare the data transfer using serial and parallel port devices along with their advantages and disadvantages. [7]
4. a) Explain the advantages and disadvantages of high level language based embedded firmware development. [7]
- b) What is interrupt? Explain its role in embedded application development. [7]
5. a) Discuss how ICE is useful for testing an Embedded System with neat diagram. [7]
- b) Explain the architecture of device drivers. [7]
6. a) Explain in detail about different files generated during the cross compilation of an Embedded C file. [7]
- b) State the uses of assembler and disassembler in embedded application development. [7]
7. a) Explain in detail the testing process involved in developing an embedded system. [7]
- b) Explain in detail about below terms: [7]
 - i) Interpreters
 - ii) Simulator

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Set No. 3

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Answer ALL sub questions from Part-A

Answer any FOUR questions from Part-B

PART-A (14 Marks)

1. a) What are the applications of embedded systems? [3]
- b) What is the role of reset circuit in embedded systems? [3]
- c) What is the difference between C and Embedded C. [2]
- d) Explain multi task and their functions in embedded system. [2]
- e) What are the advantages of simulator base debugging? [2]
- f) What is the use of host machine for embedded system? [2]

PART-B (4x14 = 56 Marks)

2. a) Distinguish between a sensor and an actuator. Explain their role in an embedded system with suitable examples. [7]
- b) Explain about application specific embedded system with suitable example. [7]
3. a) Discuss Real time clock with respect to an Embedded Hardware. [7]
- b) Compare the operation of ZigBee and Wi-Fi networks. [7]
4. a) Discuss about compiler and cross compiler with respect to Embedded Firmware. [7]
- b) Explain structure in the 'Embedded-C' programming context. Explain the significance of structure over normal variables. [7]
5. a) Explain the important Hardware Software Tradeoffs in Hardware Software Partitioning. [7]
- b) Explain how to choose an RTOS. [7]
6. a) Write notes on Embedded software development-process. [7]
- b) Explain in detail about Boundary scan. [7]
7. a) Explain how the compiling needs of an embedded system are different from that of general purpose computer with suitable examples. [7]
- b) Compare various Laboratory tools used for embedded system implementation and testing. [7]

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Answer any FOUR questions from Part-B

PART-A (14 Marks)

1. a) Discuss various embedded systems requirements. [3]
- b) What are Timer and counting devices? [3]
- c) What are concepts of Embedded C. [2]
- d) Explain the functional and non-functional requirements to choose a RTOS. [2]
- e) What are the types of files generated on cross-compilation? [2]
- f) Describe preprocessor and Interpreters. [2]

PART-B (4x14 = 56 Marks)

2. a) What is non-operational quality attributes? Explain the important non-operational Quality attributes to be considered in any embedded system design. [7]
- b) Write the details about the embedded hardware units and devices in a system. [7]
3. a) What are the various serial communication devices used in an Embedded Hardware? Explain any one of them. [7]
- b) Explain about Timer and counting devices in Embedded Hardware. [7]
4. a) Explain any one of Embedded firmware design approaches in detail. [7]
- b) With the help of appropriate diagrams explain the working of DMA. [7]
5. a) Compare various Task scheduling algorithms in RTOS. [7]
- b) Explain the different multitasking models in operating system context. [7]
6. a) Draw and explain the integrated embedded system development environment. [7]
- b) What is ROM emulator? Explain ICE based debugging in detail. [7]
7. a) Explain in detail Translation tools-Pre-processors. [7]
- b) In addition to CAD, what other techniques are used to design complex circuits. [7]