

Code No: RT42043C

R13

Set No. 1

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2018

EMBEDDED SYSTEMS

(Common to Electronics and Communications Engineering, Electronics and Instrumentation Engineering & Electronics and Computer 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 THREE questions from Part-B

PART-A (22 Marks)

1. a) What is the difference between big-endian and little-endian processors? [4]
- b) Explain the role of logic gates in embedded hardware design? [4]
- c) What is task control block (TCB)? [4]
- d) What is relocatable code? [3]
- e) List the different files generated during the cross compilation? [4]
- f) What is the use of host machine for embedded system? [3]

PART-B (3x16 = 48 Marks)

2. a) What is non-operational quality attributes? Explain the important non-operational quality attributes to be considered in any embedded system design. [8]
- b) Explain about application specific embedded system with suitable example? [8]
3. a) Explain the role of decoders in embedded hardware development. Draw the circuit diagram for interfacing a 3-bit binary decoder with 8051. [8]
- b) Explain the role of watchdog timer in Embedded System with suitable diagram. [8]
4. a) Explain the various activities involved in the creation of process and threads. [8]
- b) Three processes with process IDs P1, P2, P3 with estimated completion time 12, 10, 2 milliseconds respectively enters the ready queue together in the order P2, P3, P1. Process P4 with estimated execution completion time 4 milliseconds enters the Ready queue after 8 milliseconds. Calculate the waiting time and Turn Around Time (TAT) for each process and the average waiting time and Turn Around Time (Assuming there is no I/O waiting for the processes) in the FIFO scheduling. [8]
5. a) Explain the high level language based embedded firmware development. [8]
- b) What are pseudo-ops? What is the use of it in assembly language programming? [8]
6. a) State the uses of assembler and deassembler in embedded application development. [8]
- b) Explain the advantages and limitations of simulator based debugging. [8]
7. a) Explain about Laboratory instruments for testing the embedded system. [8]
- b) Write short notes on quality assurance and testing of the embedded system design. [8]

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Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

PART-A (22 Marks)

1. a) List out the major application areas of embedded systems. [4]
- b) What is the difference between multiplexer and de-multiplexer? [4]
- c) Explain the process management in the operating system context. [3]
- d) Explain the format of assembly language instruction. [3]
- e) Explain the various details stored in an object file generated during the cross compilation. [4]
- f) List the various simulators used for embedded system testing. [4]

PART-B (3x16 = 48 Marks)

2. a) What is programmable peripheral Interface Device? Explain the interfacing of 8255 PPI with an 8-bit microprocessor/controller. [8]
- b) Explain the different classifications of Embedded Systems. Give an example for each. [8]
3. a) What is a sequential circuit? Draw a 3-bit binary counter using T flip flop and explain its functioning. [8]
- b) Explain the role of real time clock in embedded systems with suitable diagram? [8]
4. a) What is IDLEPROCESS? What is the significance of IDLEPROCESS in the process scheduling context? [8]
- b) Explain *Thread context switch* and the various activities performed in thread context switching for user level and kernel level threads. [8]
5. a) Explain the difference between super loop based and OS based embedded firmware design. [8]
- b) List out the limitations/drawbacks of assembly language based embedded firmware development. [8]
6. a) Explain the boundary scan based hardware debugging in detail. [8]
- b) What is ROM emulator? Explain ICE based debugging in detail. [8]
7. a) Explain the important features of compilers and linkers that are relevant to embedded system? [8]
- b) List and describe the translation tools used in an embedded system. [8]

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Set No. 3

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Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

PART-A (22 Marks)

1. a) List the differences between embedded system and general computing system. [3]
- b) What is the difference between synchronous and asynchronous sequential circuits? [4]
- c) Explain the task scheduling in the operating system context. [4]
- d) What is absolute object file? [3]
- e) Explain the various details held by map file generated during the cross compilation. [4]
- f) How the target systems differ from the final embedded system? [4]

PART-B (3x16 = 48 Marks)

2. a) What are the different types of memories used in Embedded System design? Explain the role of each. [8]
- b) Discuss the concept of load store architecture and instruction pipelining. [8]
3. a) What is a combinational circuit? Draw a combinational circuit for embedded application development. [8]
- b) With suitable diagram briefly discuss about open collector and tri-state output. [8]
4. a) What is hardware software co-design? Explain the fundamental issues in hardware software co-design? [8]
- b) Explain Round Robin process scheduling with interrupts. [8]
5. a) Explain the different embedded firmware design approaches in detail. [8]
- b) List out the advantages of assembly language based embedded firmware development. [8]
6. a) Describe in detail the improvements over firmware debugging starting from the most primitive type of debugging to the most sophisticated on chip debugging. [8]
- b) Explain the different tools used for hardware debugging. [8]
7. a) List and describe the debugging tools used in an embedded system. [8]
- b) Briefly discuss about testing on host machine. [8]

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Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

PART-A (22 Marks)

1. a) What is the difference between PLD and ASIC? [4]
- b) List out the analog electronic components in embedded hardware design. [4]
- c) Explain the concept of multithreading. [4]
- d) Explain library file in assembly language. [3]
- e) What is a decompiler? [3]
- f) Explain the need of editor. [4]

PART-B (3x16 = 48 Marks)

2. a) Give an overview of the different market players of the automotive Embedded application domain. [8]
- b) What is operational quality attributes? Explain the important operational quality attributes to be considered in any embedded system design. [8]
3. a) What is an integrated circuit? Explain the different types of integrations for ICs. Give an example for each. [8]
- b) List out the differences between digital combinational and sequential circuits? [8]
4. a) What is kernel space and user space? How is kernel space and user space interfaced? [8]
- b) Explain the different task communication synchronization issues encountered in interprocess communication. [8]
5. a) State the differences between compiler and cross-compiler. Explain the Concepts of C versus Embedded C. [8]
- b) List out the advantages of high level language based embedded firmware development. [8]
6. a) Explain the role of IDE for embedded software development. [8]
- b) What are the different techniques available for embedded firmware debugging? Explain them in detail. [8]
7. with suitable example briefly discuss about [16]
(i) Linker (ii) Compiler (iii) Interpreters