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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Code No: **RT42043C**   **R13**   Set No. 2

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EMBEDDED SYSTEMS
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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]

Code No: **RT42043C**   **R13**   Set No. 3

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

Code No: **RT42043C**   **R13**   Set No. 4

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2018
EMBEDDED SYSTEMS
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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
   (i) Linker   (ii) Compiler   (iii) Interpreters [16]