Code No: **R41042** **R10** **Set No. 1**

IV B.Tech I Semester Regular/Supplementary Examinations, Nov/Dec - 2015

EMBEDDED SYSTEMS

(Common to Electronics & Communication Engineering and Electronics & Computer Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1 a) Which are the components used as the core of an embedded system? Explain the merits, drawbacks, if any, and the applications/domains where they are commonly used [8]

b) What is Sensor? Explain its role in Embedded System Design? Illustrate with an example. [7]

2 a) Explain quality attributes in the embedded system development context? What are the different Quality attributes to be considered in an embedded system design? [8]

b) Explain the Product Life-cycle curve of an embedded product development. [7]

3 a) Explain the role of the analog electronics components resistor, transistor, capacitor and diode in embedded hardware design. Draw a circuit used in embedded application using these components. [8]

b) What is schematic? Explain the role of schematic in embedded hardware design. [7]

4 a) What is the difference between `Super loop' based and 'OS' based embedded firmware design? Which one is the better approach? [8]

b) What is 'inline Assembly'? How is it different from mixing assembly language with 'C'? [7]

5 a) What is an Operating System? Where is it used and what are its primary functions? [8]

b) Explain how Threads and Processes are related? What are common to Process and Threads? [7]

6 a) What is hardware software co-design? Explain the fundamental issues in hardware software co-design. [8]

b) Explain the different techniques for embedding the firmware into the target board for a non-OS based embedded system. [7]

7 a) Explain the role of Integrated Development Environment (IDE) for Embedded Software Development. [8]

b) What are the different techniques available for embedded firmware debugging? Explain them in detail. [7]

8 a) What are some features that differentiate compiling needs in embedded systems versus in other types of computer systems? [8]

b) Why is host system used for most stages of development and test and simulation? [7]

Code No: **R41042** **R10** **Set No. 2**

IV B.Tech I Semester Regular/Supplementary Examinations, Nov/Dec - 2015

EMBEDDED SYSTEMS

(Common to Electronics & Communication Engineering and Electronics & Computer Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1 a) What is Application Specific Integrated Circuit (ASIC)? Explain the role of ASIC in Embedded System design? [8]
b) What is Actuator? Explain its role in Embedded System Design? Illustrate with an example. [7]

2 a) What is operational quality attribute? Explain the important operational quality attributes to be considered in any embedded system design. [8]
b) Explain Time-to-market? What is its significance in product development? [7]

3 a) Explain the difference between digital combinational and sequential circuits [8]
b) What is an Integrated Circuit (IC)? Explain the different types of integrations for ICs. Give an example for each [7]

4 a) Explain the format of assembly language instruction. [8]
b) Explain structure in the 'Embedded C' programming context. Explain the significance of structure over normal variables. [7]

5 a) What is kernel space and user space? How is kernel space and user space interfaced? [8]
b) Why is thread creation faster than process creation? [7]

6 a) Explain the difference between SIMD, MIMD and VLIW architecture. [8]
b) Explain the major drawbacks of out-of-circuit programming. [7]

7 a) What are the different files generated during the cross-compilation of an Embedded C file? Explain them in detail. [8]
b) What is a Monitor program? Explain its role in embedded firmware debugging? [7]

8 a) List and define the four models under which testing techniques fall. Within each of these models, what are five types of testing that can occur? [8]
b) What is back support package? What are the various components of a target emulator? What are the advantages of using an ICE? [7]

Code No: **R41042** **R10** **Set No. 3**

IV B.Tech I Semester Regular/Supplementary Examinations, Nov/Dec - 2015

EMBEDDED SYSTEMS

(Common to Electronics & Communication Engineering and Electronics & Computer Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1 a) What is the difference between microprocessor and microcontroller? Explain the role of microprocessors and controllers in embedded system design? [8]
b) What are the advantages of FLASH over other program storage memory in Embedded System design? [7]

2 a) What is non-operational quality attribute? Explain the important non-operational quality attributes to be considered in any embedded system design. [8]
b) Explain the significance of the quality attributes Testability and Debug-ability in the embedded system design context. [7]

3 a) Explain the terms 'Layout' and 'Layout Design' in the hardware design context [8]
b) What is the difference between 'Single In-line Package' (SIP) and 'Dual In-line Package' (DIP)? [7]

4 a) What is relocatable code? Explain its significance in assembly programming [8]
b) Explain the declaration and initialization of structure variables. [7]

5 a) What is the difference between a General Purpose kernel and a Real-Time kernel? Give an example for both Real-Time Operating System (RTOS). [8]
b) Explain the various factors to be considered for the selection of a scheduling criteria. [7]

6 a) Explain the different computational models in embedded system design. [8]
b) Explain the firmware embedding process for OS based embedded products. [7]

7 a) Explain the various details stored in an Object file generated during the cross-compilation of an Embedded C file. [8]
b) What is ROM emulation? Explain In Circuit Emulator (ICE) based debugging in detail. [7]

8 a) In addition to CAD, what other techniques are used to design complex circuits? [8]
b) What is the use of a simulator in a development phase? [7]

Code No: **R41042** **R10** **Set No. 4**

IV B.Tech I Semester Regular/Supplementary Examinations, Nov/Dec - 2015

EMBEDDED SYSTEMS

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Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1 a) What is Digital Signal Processor (DSP)? Explain the role of DSP in embedded system design? [8]
b) What is Embedded Firmware? What are the different approaches available for Embedded Firmware development? [7]

2 a) Explain the quality attribute Throughput in the embedded system design context. [8]
b) The availability of an embedded product is 90%. The Mean Time Between Failure (MTBF) of the product is 30 days. What is the Mean Time To Repair (MTTR) in days/hours for the product? [7]

3 a) What is the difference between 'Package' and 'Footprint'? Explain the significance of both in embedded hardware design [8]
b) What is 'layer' in the embedded hardware design context? [7]

4 a) What is the difference between compiler and cross-compiler? [8]
b) What are the different types of pre-processor directives available in 'Embedded C'? Explain them in detail. [7]

5 a) What is the difference between 'Hard' and 'Soft' real-time systems? Give an example for 'Hard' and 'Soft' Real-Time kernels. [8]
b) Explain the different queues associated with process scheduling. [7]

6 a) What is the difference between Data Flow Graph (DFG) and Control Data Flow Graph (CDFG) model? Explain their significance in embedded system design. [8]
b) What is the difference between In System Programming (ISP) and In Application Programming (IAP)? [7]

7 a) Explain the difference between Intel Hex and Motorola Hex file format. [8]
b) Explain the Boundary Scan based hardware debugging in detail. [7]

8 a) What is a preprocessor? Provide a real-world example of how a preprocessor is used in relation to a programming language. [8]
b) Explain the use of the following hardware tools: target emulator and ICE. [7]