Code No: **RT42043C** **R13** **Set No. 1**

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2019

EMBEDDED SYSTEMS

(Common to Electronics and Communications Engineering, Electronics and Instrumentation Engineering and 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

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PART–A *(22 Marks)*

1. a) List the different categories of Embedded Systems based on the area of applications. [3]
   b) Explain any two wireless communication devices used in an Embedded System. [4]
   c) Explain the different files generated during the cross-compilation of an Embedded C file. [3]
   d) Explain multi task and their functions in embedded system. [4]
   e) Compare Emulator and Simulator along with their major differences. [4]
   f) Distinguish between software and hardware based debugging. [4]

PART–B *(3x16 = 48 Marks)*

2. a) Explain the operational quality attributes to be considered in the design of an embedded system. [8]
   b) Discuss the Application Specific Embedded system with an example. [8]

3. a) Explain about serial communication devices and parallel device ports. [8]
   b) Discuss the significance of Watchdog timer in an Embedded System. [8]

4. a) What is a Device Driver? Explain different types of device drivers and use of them. [8]
   b) Explain different Embedded Firmware design approaches. [8]

5. a) Describe Embedded programming tools (i) Integrated Development Environment, (ii) Compiler and (iii) Cross-compiler. [8]
   b) Explain different files generated on cross-compilation and also explain about decompiler. [8]

6. a) What is a simulator? Explain the features, advantages and limitations of simulator based debugging [8]
   b) Explain the role of Integrated Development Environment (IDE) in the design of an Embedded System application [8]

7. a) Explain the testing steps on host machine. Why host system is used for most of the development? [8]
   b) What is a target system? Explain the process of loading Embedded Software into the target system. [8]

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

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2019

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

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PART–A *(22 Marks)*

1. a) List the Application-specific and Domain Specific examples of an embedded System. [3]
   b) Distinguish between serial and parallel communication devices. [4]
   c) Compare Compiler and Cross-compiler. [4]
   d) Explain the functional and non-functional requirements to choose a RTOS. [4]
   e) What is an IDE? [3]
   f) List out the translation tools used in an Embedded system. [4]

PART–B *(3x16 = 48 Marks)*

2. a) Explain how Digital Signal processor and Media processor are different than a general purpose processor and also compare them. [8]
   b) Distinguish between a sensor and an actuator. Also explain their role in an embedded system with suitable examples. [8]

3. a) Explain the purpose of a Real Time Clock and its functionality in an embedded system. [8]
   b) Explain serial interface, timer and counters along with their usage in an embedded processor. [8]

4. a) Explain the following: (i) interrupt (ii) Interrupt Vector address and (iii) Interrupt Service Routine (ISR)? Explain the role of ISR in an embedded application development [8]
   b) Briefly discuss about the different types of device drivers used in an embedded system along with their usage. [8]

5. a) Compare various Task scheduling algorithms in RTOS. [8]
   b) Differentiate between Hardware and Software Co-Design with all the salient features of them. [8]

6. a) Explain how cross-compiler is used for host and target machines? [8]
   b) Discuss Embedded Software Development Tools in details. [8]

7. a) Explain the following (i) Interpreter, (ii) Compiler and (iii) Linker [8]
   b) Compare various Laboratory tools used for embedded system implementation and testing. [8]

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

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2019

EMBEDDED SYSTEMS

(Common to Electronics and Communications Engineering, Electronics and Instrumentation Engineering and 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

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PART–A *(22 Marks)*

1. a) List out the different communication Interface used in an embedded system. [3]
   b) Explain the role of watchdog timer in a single board computer. [4]
   c) Give the functionalities of an Embedded device driver. [4]
   d) Explain different Computational models used in an Embedded System design. [4]
   e) What is an IDE and what is the selection criterion of an IDE. [4]
   f) Describe preprocessor and Interpreters. [3]

PART–B *(3x16 = 48 Marks)*

2. a) Explain the classification of the embedded systems and explain each of them. [8]
   b) Explain the PCB design steps with neat diagrams and also give the details of the components and elements facts in the process flow. [8]

3. a) Explain the purpose of (i) Counting Device and (ii) Real Time Clock in an embedded system, [8]
   b) Explain different I/O subsystems of embedded systems. [8]

4. a) What are the different possible sources of interrupts? Explain different interrupt service mechanisms. [8]
   b) What is a device driver? Explain the programming of the device driver with an example. [8]

5. a) In a real time system having periodic Tasks T1, T2, T3 and an aperiodic task T4 all requesting at time $t = 0$ have the following properties.

Task	Period	Execution Time	Dead Line
T_1	210	70	210
T_2	70	21	70
T_3	140	28	140
T_4	aperiodic	80	420

   (i) Calculate the utilization ratios and hence find the scheduling.
   (ii) Determine whether the tasks can meet deadlines. [8]
   b) Explain the important Hardware Software Tradeoffs in Hardware Software Partitioning. [8]

6. a) Explain various techniques used for uploading the code in to the target Hardware. [8]
   b) Discuss the Boundary Scan based hardware debugging in detail. [8]

7. a) Explain in detail the testing process involved in developing an embedded system. [8]
   b) Explain how the compiling needs of an embedded system are different from that of general purpose computer with suitable examples. [8]

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

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2019

EMBEDDED SYSTEMS

(Common to Electronics and Communications Engineering, Electronics and Instrumentation Engineering and 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

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PART–A *(22 Marks)*

1. a) Explain the purpose of an Embedded System. [4]
   b) Explain the role of the analog electronics components like resistor, transistor, capacitor and diode in embedded hardware design. [3]
   c) Explain the serial communication SCI and SPI and compare them. [4]
   d) Compare In System Programming (ISP) and In Application Programming (IAP). [4]
   e) Explain JTAG based boundary scanning for hardware testing. [4]
   f) Explain how CAD and the hardware are useful in Embedded System Implementation. [3]

PART–B *(3x16 = 48 Marks)*

2. a) Explain the quality and non-quality attributes of an embedded system. [8]
   b) Explain about Domain Specific Embedded System application by taking an Automotive Embedded System (AES) as an example. [8]

3. a) Explain the working of watchdog timer and also explain about control and status registers. [8]
   b) Compare the data transfer using serial and parallel port devices along with their advantages and disadvantages. [8]

4. a) Explain the working of DMA with appropriate diagrams. [8]
   b) Discuss the development procedure for parallel port device driver. [8]

5. a) Explain how thread and process are used in an embedded system. [8]
   b) Discuss how ICE is useful for testing an Embedded System with neat diagram. [8]

6. a) Explain different cross development tools for an embedded system. [8]
   b) Explain all the software development tools available in IDE. [8]

7. a) Explain the following Laboratory Tools (i) Logic Probe (ii) Oscilloscope (iii) Logic Analyzer (iv) System Monitor Codes [8]
   b) Explain at least four models that are used for testing an Embedded System. [8]