**20EC506/JO**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | |
| **January, 2024** | **Electronics & Communication Engineering** | | |
| **Fifth Semester** | **Embedded System & Design** | | |
| **Time:** Three Hours | | **Maximum: 7**0 Marks | |
| *Answer Question No. 1 Compulsorily.* | | | (14X1 = 14 Marks) |
| *Answer ONE question from each Unit.* | | | (4X14=56 Marks) |

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| 1. | a) | | What is an embedded system? List its categories. | CO1 | L2 | 1M |
|  | b) | | What is firmware? | CO1 | L1 | 1M |
|  | c) | | Differentiate soft real-time OS and hard real-time OS | CO1 | L1 | 1M |
|  | d) | | How does a microcontroller differ from a DSP? | CO2 | L2 | 1M |
|  | e) | | Define Task and Task State | CO2 | L3 | 1M |
|  | f) | | What is deadlock? | CO2 | L2 | 1M |
|  | g) | | What is difference between pipes and message queues? | CO3 | L2 | 1M |
|  | h) | | Differentiate Van-Neumann and Hardvard Architecture. | CO3 | L2 | 1M |
|  | i) | | What is Pipeline? Explain its function in an ARM processor. | CO3 | L1 | 1M |
|  | j) | | How many Modes are there in ARM processor & What are they? | CO3 | L2 | 1M |
|  | k) | | What is the purpose of control flow instructions in ARM Processors? | CO4 | L3 | 1M |
|  | l) | | What are the instructions used to access the memory in ARM? | CO4 | L2 | 1M |
|  | m) | | Write assembly language program of addition of 2 numbers using ARM. | CO4 | L2 | 1M |
|  | n) | | List the applications of ARM Processor. | CO4 | L3 | 1M |
| **Unit -I** | | | | | | |
| 2. | a) | | Mention various applications of embedded systems. | CO1 | L1 | 4M |
|  | b) | | Explain the different classifications of embedded systems. Give an example for each. | CO1 | L3 | 10M |
|  |  | | **(OR)** |  |  |  |
| 3. | |  | With the help of neat block diagram, explain architecture of embedded system. | CO1 | L2 | 14M |
|  |  | | **Unit -II** |  |  |  |
| 4. |  | | Write in detail about any three disk scheduling algorithms. | CO2 | L3 | 14M |
|  |  | | **(OR)** |  |  |  |
| 5. | a) | | What is a semaphore? Explain briefly about the types of semaphores with suitable examples. | CO2 | L1 | 7M |
|  | b) | | What is the Priority Inversion Problem? How Priority Inheritance provides a solution to the Priority Inversion Problem, Explain. | CO2 | L3 | 7M |
|  |  | | **Unit -III** | |  |  |
| 6. | a) | | With a neat sketch explain the architecture of the ARM Processor. And list its features. | CO3 | L4 | 7M |
|  | b) | | Explain in detail the ARM Processor Modes. | CO3 | L2 | 7M |
|  |  | | **(OR)** |  |  |  |
| 7. | a) | | What is pipelining in a processor? Explain in brief about various stages of pipelining in ARM processors. | CO3 | L1 | 7M |
|  | b) | | Explain briefly about the register set of the ARM Processor. | CO3 | L2 | 7M |
|  |  | | **Unit -IV** |  |  |  |
| 8. | a) | | Explain the following ARM instructions with an example  i) Move ii) Comparison | CO4 | L1 | 7M |
|  | b) | | With a block diagram, mention the components and in the design of a washing machine and also explain its working. | CO4 | L3 | 7M |
|  |  | | **(OR)** |  |  |  |
| 9. | a) | | Write an assembly language program to multiply two 16-bit binary numbers | CO4 | L2 | 7M |
|  | b) | | Develop an ARM program to scan a series of 32 bit numbers to find how many are negative and positive. | CO4 | L3 | 7M |

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