



BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – B.Tech.(ECE)-2019/B.Tech.(ECE)-2020
Course Name – Embedded System
Course Code - PEC-ECEL801A
(Semester VIII)

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

(i) Cite the definition of an embedded system.

- | | |
|--|---------------------------------------|
| a) A system that is easily removable | b) A system that is stationary |
| c) A system that is designed to perform specific tasks | d) A system that can perform any task |

(ii) Compare and contrast a general-purpose computer and an embedded system to identify their main difference.

- | | |
|---|---|
| a) An embedded system is less expensive | b) An embedded system is more powerful |
| c) An embedded system is designed for a specific task | d) An embedded system is more user-friendly |

(iii) Articulate the concept of embedded memories to provide a clear explanation.

- | | |
|---|---|
| a) Memories that are not physically embedded in a system. | b) Memories that are integrated into a system's chip. |
| c) Memories that are attached to a system using cables. | d) Memories that are stored on an external device. |

(iv) Calculate the storage capacity of a 64-kilobit memory using a mathematical formula.

- | | |
|----------------|-----------------|
| a) 8 kilobytes | b) 64 kilobytes |
| c) 8 megabytes | d) 64 megabytes |

(v) Articulate the purpose of interfacing between analog and digital blocks in an embedded system.

- | | |
|---------------------------------|----------------------------------|
| a) To increase processing speed | b) To reduce power consumption |
| c) To improve accuracy | d) To decrease system complexity |

(vi) Provide an example of an analog signal.

- | | |
|----------------|--------------------|
| a) Binary code | b) Voltage level |
| c) Logic gate | d) Instruction set |

(vii) Asking for the name of the process of removing noise from a signal.

- | | |
|--------------|---------------|
| a) filtering | b) modulation |
|--------------|---------------|

- c) amplification
 (viii) Give an example of a digital signal in embedded systems and associate it with the appropriate type.
 a) Temperature
 c) Binary data
 (ix) Describe the concept of sub-system interfacing in embedded systems and explain its significance.
 a) Interfacing between different sub-systems in an embedded system
 c) The use of external memory in embedded systems
 (x) Identify a disadvantage of using sub-system interfacing in embedded systems and contrast it with the advantages.
 a) Reduced system complexity
 c) Reduced system cost
 (xi) Identify an embedded system that can interface with an external system.
 a) Washing machine
 c) Automobile
 (xii) Explain how a driver facilitates the interfacing of an embedded system with an external system.
 a) To translate data between systems
 c) To reduce the cost of the external system
 (xiii) Define process compatibility in embedded system design.
 a) The ability to integrate hardware with software
 c) The ability to reduce power consumption in embedded systems
 (xiv) Judge the main tradeoff linked with process compatibility in embedded system design.
 a) Power consumption vs. performance
 c) Cost vs. reliability
 (xv) Asking, what software is responsible for controlling the hardware of an embedded system?
 a) Firmware
 c) System software
- d) demodulation
 b) Pressure
 d) Sound
 b) A method of connecting embedded systems to the internet
 d) No correct option
 b) Improved system reliability
 d) No correct answer found
 b) Microwave oven
 d) all correct options
 b) To provide power to the external system
 d) To increase the speed of the external system
 b) The ability to use the same manufacturing process across different ICs
 d) The ability to interface with external systems
 b) Integration vs. security
 d) Process compatibility vs. design flexibility
 b) Middleware
 d) Application software

Group-B

(Short Answer Type Questions)

3 x 5=15

2. State the purpose of embedded memory. (3)
3. Explain analog interfacing in embedded systems. (3)
4. Explain what a microcontroller core does. (3)
5. Discover the role of a scheduler in a real-time operating system. (3)
6. Analyze the importance of power consumption in embedded systems and its impact on system performance. (3)

OR

Appraise the challenges associated with testing and debugging embedded systems and the strategies used to overcome them. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Design an embedded system by considering relevant factors. (5)
8. Interconnect analog and digital blocks in embedded systems using appropriate techniques. (5)
9. Diagram the different types of filters used for signal conditioning in embedded systems and their applications. (5)
10. Evaluate the importance of digital signal processing in embedded systems and manage DSP applications in different industries. (5)
11. Survey the features and capabilities of SPI and formulate its role in interfacing with external systems in embedded systems. (5)
12. Analyze inter-task communication in a real-time operating system and structure its impact on system performance. (5)

OR

Devise software design tradeoffs in embedded systems and propose examples of such tradeoffs. (5)
