**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**

(AUTONOMOUS)

(Approved by AICTE, New Delhi& Affiliated to JNTUA, Ananthapuramu)

(Accredited by NBA for Civil, EEE, Mech., ECE & CSE)

(Accredited by NAAC with 'A+' Grade)

Puttur -517583, Chittoor District, A.P. (India)

**QUESTION BANK (DESCRIPTIVE)**

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|---|---|---|---|
| **Subject Name and Code** | ELEMENTS OF EMBEDDED SYSTEMS (20EC0452)- Open Elective -II | **COURSE & BRANCH:** | B. Tech – EEE, CSE |
| **YEAR & SEM:** | III & II | **REGULATION:** | R20 |

## UNIT-I Introduction to Embedded Systems

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|---|---|---|---|---|
| **1** | **a)** | Define embedded system and List the various processors types of embedded processors. | **[L1][CO1]** | **[06M]** |
| | **b)** | List any Seven differences between Embedded Systems Vs General Computing. | **[L1][CO1]** | **[06M]** |
| **2** | **a)** | Brief the History of Embedded Systems. | **[L1][CO1]** | **[06M]** |
| | **b)** | Sketch the various classifications of Embedded systems. | **[L3][CO1]** | **[06M]** |
| **3** | **a)** | Explain the classification of Embedded systems based on generation. | **[L2][CO1]** | **[06M]** |
| | **b)** | Explain the classification of Embedded systems based on Complexity. | **[L2][CO1]** | **[06M]** |
| **4** | **a)** | Explain the classification of Embedded systems based on Performance and Functional Requirements. | **[L2][CO1]** | **[06M]** |
| | **b)** | Explain the classification of Embedded systems based on Deterministic Behavior and Triggering. | **[L2][CO1]** | **[06M]** |
| **5** | | Briefly discuss the major application of Embedded systems. | **[L2][CO1]** | **[12M]** |
| **6** | **a)** | List out the characteristics of Embedded systems. | **[L1][CO1]** | **[06M]** |
| | **b)** | With the neat sketch, Explain architecture of embedded system. | **[L3][CO1]** | **[06M]** |
| **7** | | With the neat sketch, Explain the general block diagram of embedded system. | **[L3][CO1]** | **[12M]** |
| **8** | | List the major difference between RAM and ROM memory. | **[L1][CO1]** | **[12M]** |
| **9** | | With a neat diagram, explain the design process of an embedded system | **[L2][CO1]** | **[12M]** |
| **10** | | Explain in brief about the programming languages used for the development of Embedded systems. | **[L2][CO1]** | **[12M]** |

## UNIT-II Typical Embedded System

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| **1** | **a)** | Explain in detail the Core of the Embedded system | **[L2][CO1]** | **[06M]** |
| | **b)** | Distinguish between RISC and CISC design. | **[L2][CO1]** | **[06M]** |
| **2** | **a)** | Define Memory shadowing | **[L1][CO2]** | **[04M]** |
| | **b)** | List the difference between volatile and non-volatile memory | **[L1][CO2]** | **[08M]** |
| **3** | | Explain the different classification of Program Storage Memory | **[L1][CO2]** | **[12M]** |
| **4** | **a)** | Differentiate static RAM and Dynamic RAM. | **[L4][CO2]** | **[06M]** |
| | **b)** | Elaborate the classification of working RAM. | **[L3][CO2]** | **[06M]** |
| **5** | **a)** | Distinguish between Von-Neumann and Harvard architecture. | **[L2][CO1]** | **[06M]** |
| | **b)** | Define sensor and Actuator and examples for each. | **[L1][CO4]** | **[06M]** |
| **6** | **a)** | Discuss in detail about 7-segment LED display | **[L2][CO3]** | **[06M]** |
| | **b)** | Explain the working principal of Optocoupler | **[L2][CO3]** | **[06M]** |
| **7** | **a)** | With a neat sketch, Explain the working principle of Stepper motor. | **[L3][CO3]** | **[12M]** |
| | **b)** | Define Relay, Piezo Buzzer | **[L1][CO3]** | **[06M]** |
| **8** | | Discuss in detail the interfacing of 8255 with an 8-bit microcontroller | **[L2][CO3]** | **[12M]** |
| **9** | **a)** | Explain the working principle of Photo diode. | **[L2][CO3]** | **[06M]** |
| | **b)** | Explain the role of following in embedded system.<br>i) Oscillator ii) Brownout Protection | **[L2][CO2]** | **[06M]** |
| **10** | **a)** | Explain the role of following circuitry in embedded system.<br>i) Reset Circuit ii) Real Time Clock | **[L2][CO2]** | **[06M]** |
| | **b)** | Explain the role of following circuitry in embedded system.<br>i) Watchdog Timer ii) Embedded Firmware | **[L2][CO2]** | **[06M]** |

## Unit- III Communication

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| **1** | **a)** | Define on-board communication interface & List it. | **[L1][CO2]** | **[06M]** |
| | **b)** | Define GPRS & List the services. | **[L1][CO2]** | **[06M]** |
| **2** | | Explain the concept of I2C in Detail. | **[L2][CO2]** | **[12M]** |
| **3** | | What is serial peripheral interface explain in detail. | **[L1][CO2]** | **[12M]** |
| **4** | **a)** | With a neat sketch explain UART communication interfaces. | **[L3][CO2]** | **[06M]** |
| | **b)** | Explain the 1-wire interface communication interface. | **[L2][CO2]** | **[06M]** |
| **5** | **a)** | Explain the Parallel interface with suitable diagram | **[L2][CO2]** | **[06M]** |
| | **b)** | Compare between Serial and parallel interface | **[L2][CO2]** | **[06M]** |
| **6** | **a)** | Explain the features of Wi-Fi network | **[L2][CO3]** | **[06M]** |
| | **b)** | Explain the concept of Zigbee module. | **[L2][CO3]** | **[06M]** |
| **7** | **a)** | Explain the concept of RS232 communication Interface | **[L2][CO3]** | **[06M]** |
| | **b)** | Explain the concept of RS485 communication Interface | **[L2][CO3]** | **[06M]** |
| **8** | **a)** | Explain in detail about the USB and its types of data transfer | **[L2][CO3]** | **[06M]** |
| | **b)** | Brief the concept of IEEE1394 | **[L1][CO3]** | **[06M]** |
| **9** | **a)** | Discuss the concept of IrDA. | **[L2][CO3]** | **[06M]** |
| | **b)** | Explain the features of Bluetooth. | **[L2][CO3]** | **[06M]** |
| **10** | | Draw & Explain the architecture of GPRS. | **[L1][CO3]** | **[12M]** |

## Unit- IV Designing of Embedded Systems with Arduino Microcontrollers

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|---|---|---|---|---|
| **1** | **a)** | What are the features of Arduino Uno platform? | **[L1][CO3]** | **[06M]** |
| | **b)** | What is Arduino and list its advantages? | **[L1][CO3]** | **[06M]** |
| **2** | | With a neat block diagram explain the Arduino architecture. | **[L3][CO3]** | **[12M]** |
| **3** | | Explain with a neat sketch the pin diagram of Arduino ATMege328 | **[L2][CO3]** | **[12M]** |
| **4** | | In which language Arduino software was written and also elaborate the software structure functions. | **[L2][CO4]** | **[12M]** |
| **5** | **a)** | What is interfacing with Arduino? | **[L1][CO4]** | **[06M]** |
| | **b)** | What are the features of Arduino programming languages? | **[L1][CO4]** | **[06M]** |
| **6** | | Write a suitable program to interface temperature sensor using Arduino UNO. | **[L2][CO4]** | **[12M]** |
| **7** | | Write a program for LCD and Keyboard programming interface for an Arduino | **[L2][CO4]** | **[12M]** |
| **8** | | Write a suitable program to interface Stepper motor with Arduino processor. | **[L2][CO4]** | **[12M]** |
| **9** | | Write a program to control DC motor using PWM technique | **[L2][CO4]** | **[12M]** |
| **10** | | Write a program to perform serial communication using Arduino. | **[L2][CO4]** | **[12M]** |

## Unit- V Introduction to IOT

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|---|---|---|---|---|
| **1** | **a)** | What is IoT and its characteristics? | **[L1][CO5]** | **[06M]** |
| | **b)** | Briefly discuss the Architecture of IoT. | **[L2][CO5]** | **[06M]** |
| **2** | **a)** | What is an IP addresses and explain its working. | **[L1][CO5]** | **[06M]** |
| | **b)** | Briefly discuss about HTTP and Websocket protocols. | **[L2][CO5]** | **[06M]** |
| **3** | **a)** | Explain the different classification of IP Address | **[L2][CO5]** | **[06M]** |
| | **b)** | Differentiate between MAC address and IP address | **[L2][CO5]** | **[06M]** |
| **4** | **a)** | Compare the TCP and UDP protocols associated with transport layer of IoT. | **[L2][CO5]** | **[06M]** |
| | **b)** | What are the application layer protocols in IoT | **[L1][CO5]** | **[06M]** |
| **5** | | Briefly discuss the MQTT, XMPP and CoAP protocols in | **[L2][CO5]** | **[12M]** |

| | | | | |
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| | | application layer. | | |
| **]6** | | How the IoT technology can be implemented in home automation such as smart lightening and intrusion detection systems? | **[L2][CO6]** | **[12M]** |
| **7** | | How the IoT technology can be implemented in smart appliances and smoke/gas detection systems? | **[L2][CO6]** | **[12M]** |
| **8** | | Explain how IoT technology can used in the following application areas:<br>(i)Structural health monitoring (ii)Emergency response | **[L2][CO6]** | **[12M]** |
| **9** | | Explain how IoT technology can used in the following application areas:<br>(i)Surveillance (ii)Weather monitoring | **[L2][CO6]** | **[12M]** |
| **10** | | With the help of following sectors explain how IoT technology is impacting on the agriculture sector:<br>(i) Smart Irrigation (ii) Green house control | **[L2][CO6]** | **[12M]** |

**Prepared by,**

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