Course Code: 20EC0422 **R20**

SIDDAHRTH INSTITUTE OF ENGINEERING AND TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
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QUESTION BANK (DESCRIPTIVE)

Subject with Code: Embedded Systems and IoT (20EC0422) **Course & Branch**: B.Tech - ECE

Regulation: R20 **Year & Sem:**III-B.Tech & II-Sem

UNIT –I
INTRODUCTION TO EMBEDDED SYSTEMS

1	**a**	Define embedded system and Write any four important characteristics of embedded systems	[L1][CO1]	**[06M]**
	b	Explain the different classifications of embedded systems. Give an example for each	[L2][CO1]	**[06M]**
2	**a**	List various applications of embedded systems.	[L1][CO1]	**[06M]**
	b	Distinguish between Von-Neumann and Harvard architecture.	[L2][CO1]	**[06M]**
3	**a**	Distinguish between RISC and CISC design.	[L2][CO1]	**[06M]**
	b	Define embedded processor and List various types of embedded processors	[L1][CO1]	**[06M]**
4	**a**	Explain the differences between I2C and SPI interface	[L2][CO1]	**[08M]**
	b	Explain UART	[L2][CO1]	**[04M]**
5	**a**	Describe about 1-wire and parallel interface	[L1][CO1]	**[08M]**
	b	Explain the RS-232 and RS-485 interfaces in embedded systems	[L2][CO1]	**[04M]**
6	**a**	Explain the following interfaces: i)IEEE1394 ii)IrDA	[L1][CO1]	**[06M]**
	b	Write the features of Bluetooth and Wi-Fi	[L1][CO1]	**[06M]**
7	**a**	Explain Zigbee and GPRS	[L2][CO1]	**[06M]**
	b	Explain the role of following circuitry in embedded system i) Reset Circuit ii) Brownout protection	[L2][CO1]	**[06M]**
8	**a**	Explain the role of following in embedded system i) Oscillator ii) Real Time Clock	[L2][CO1]	**[06M]**
9	**a**	Expalin Watchdog Timer and Embedded Firmware	[L2][CO1]	**[06M]**
	b	With a neat diagram, explain the design process of an embedded system	[L2][CO1]	**[06M]**
10	**a**	Explain the programming languages	[L2][CO1]	**[06M]**
	b	Describe the IDE tools for developing application on embedded system	[L2][CO1]	**[06M]**

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UNIT –II
IOT INTRODUCTION & CONCEPTS

1	**a**	Define IoT and Describe the characteristics	[L2][CO2]	**[06M]**
	b	Illustrate the Physical design with an generic block diagram of an IoT device and explain it briefly.	[L2][CO2]	**[06M]**
2	**a**	Classify the protocols associated with network/internet layer of IoT.	[L2][CO3]	**[06M]**
	b	Explain the various link layer protocols of IoT.	[L2][CO3]	**[06M]**
3	**a**	Compare the protocols associated with transport layer of IoT	[L2][CO3]	**[06M]**
	b	With a neat sketch, explain the Logical Design of an IoT.	[L3][CO2]	[06M]
4	**a**	Explain the IoT enabling technology such as wireless sensor network and Cloud Computing IoT and define its Characteristics.	[L2][CO2]	**[06M]**
	b	With the help of neat diagrams, describe the level1 to level3 of IoT and Deployment Templates with an example.	[L1][CO2]	**[06M]**
5	**a**	With the help of neat diagrams, describe the level4 to level6 of IoT and Deployment Templates with an example.	[L1][CO2]	**[06M]**
	b	Explain in brief IoT applications	[L2][CO2]	**[06M]**
6	**a**	How the IoT technology can be implemented in Home automation such as smart lighting and intrusion detection systems?	[L2][CO2]	**[06M]**
	b	How the IoT technology can be implemented in smart appliances and smoke/gas detection systems?	[L2][CO2]	**[06M]**
7	**a**	Explain how IoT technology can used in cities the following application areas: (i) Smart Parking system (ii) Smart roads	[L2][CO2]	**[04M]**
	b	Describe how the environment can be more protected with the help of IoT technology in the following categories: (i) Air pollution monitoring (ii) Noise pollution monitoring (iii) Forest fire detection (iv) River flood detection	[L2][CO2]	**[08M]**
8	**a**	Describe the implementation of IoT technology into distributed energy systems to optimize the efficiency of energy infrastructure and reduce wastage in the following categories: (i) Smart grids (ii) Renewable energy systems (iii) Prognostics.	[L2][CO2]	**[04M]**
	b	Explain the necessity of adopting IoT technology for a growing need to increase customer loyalty and deliver the best in-store experience by retail sector in the following sectors: (i) Inventory management (ii) Smart payments (iii) Smart vending machines	[L2][CO2]	**[04M]**
9	**a**	With the help of following sectors explain how IoT technology is impacting on the end-to-end value chain in the logistics sector: (i)Route generation & scheduling (ii) Remote vehicle diagnostics	[L2][CO2]	**[04M]**
	b	With the help of following sectors explain how IoT technology is impacting on the agriculture sector: (i) Smart Irrigation (ii) Green house control	[L2][CO2]	**[04M]**
10	**a**	Explain how IoT technology can used in the Industry: i) Machine Diagnosis &Prognosis ii)Indoor Air Quality Monitoring	[L2][CO2]	**[06M]**
	b	Describe the implementation of IoT technology in Health and life style as health and fitness monitoring	[L2][CO2]	**[06M]**

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UNIT –III
IOT AND M2M AND INTRODUCTION TO ARDUINO

1	**a**	Define M2M and List out the communication protocols used for M2M local area networks.	[L1][CO3]	**[06M]**
	b	Explain the differences between Machines in M2M and Things in IoT.	[L2][CO3]	**[06M]**
2	**a**	Draw the structure of Software defined networking for IoT & Explain it	[L2][CO3]	**[06M]**
	b	Explain the network Function Vitualisation	[L2][CO3]	**[06M]**
3	**a**	Explain the Key elements of Software defined network for IoT.	[L2][CO3]	**[06M]**
	b	With the help of neat diagrams, explain the M2M system architecture.	[L2][CO2]	**[06M]**
4		Explain in detail about Arduino board and I/O pins with a neat sketch	[L2][CO3]	**[12M]**
5	**a**	Define an Arduino , Expalin Arduino tools and Hardware.	[L2][CO3]	**[06M]**
	b	What are the software structure functions in Arduino?	[L1][CO3]	**[06M]**
6		Develop a program for LCD and Keyboard programming interface for an Arduino	[L3][CO3]	**[12M]**
7	**a**	Construct a program in Arduino to work as a counter	[L3][CO3]	**[06M]**
	b	Write a program for Arduino to work as a Timer.	[L3][CO3]	**[06M]**
8	**a**	Develop a program to produce a Interrupt in Arduino	[L3][CO3]	**[06M]**
	b	Write a program to perform ADC with the sensor inputs	[L3][CO3]	**[06M]**
9		Formulate a program to interface I2C with DAC programming for Arduino	[L3][CO3]	**[12M]**
10	**a**	Illustrate a suitable program to interface Stepper motor with Arduino processor	[L3][CO3]	**[06M]**
	b	Develop a program to control DC motor using PWM technique	[L3][CO3]	**[06M]**

UNIT –IV
DEVELOPING INTERNET OF THINGS

1	a	List out the various steps involved in IoT system design methodology.	[L1][CO4]	**[06M]**
	b	Distinguish between a Physical entity and virtual entity.	[L2][CO4]	**[06M]**
2		Describe the following steps involved in IoT system design methodology: (i) Purpose & Requirements Specification (ii) Process Specification	[L2][CO4]	**[12M]**
3		Describe the following steps involved in IoT system design methodology: (i) Information model Specification (ii) Service Specifications	[L2][CO4]	**[12M]**
4	**a**	Explain the characteristics of Python programming language.	[L2][CO4]	**[06M]**
	b	Distinguish between procedure-oriented programming and object-oriented programming.	[L2][CO4]	**[06M]**
5	**a**	Mention the advantages of IoT design methodology contrast to traditional designing of IoT.	[L2][CO2]	**[04M]**
	b	Explain the following data types and data structures of python with an example. (i) Numbers (ii) Strings iii)Tuples iv)Dictionaries	[L2][CO4]	**[08M]**
6	a	Explain the control flow statements such as if ,for,while and Range with an example	[L2][CO4]	**[06M]**
	b	Explain Functions and Modules in python with an example	[L2][CO4]	**[06M]**
7		Explain the following data types of python with an example: (i) Type conversions (ii) Lists	[L2][CO4]	**[12M]**
8		Explain the function with default arguments, passing by reference, keyword arguments and variable length arguments with an example each.	[L2][CO4]	**[12M]**
9		Explain File handling and date/time operations in python with an example.	[L2][CO4]	**[12M]**
10	**a**	Explain about the classes in python with some examples.	[L2][CO4]	**[06M]**
	b	Describe the packages used in python.	[L2][CO4]	**[06M]**

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UNIT –V
IOT PHYSICAL DEVICES & ENDPOINTS

1	**a**	With the help of neat diagram explain the basic building blocks of IoT device.	[L2][CO4]	**[06M]**
	b	Justify how Raspberry Pi is different from a desktop computer.	[L6][CO4]	**[06M]**
2	**a**	Describe the various features of a Raspberry Pi board.	[L2][CO4]	**[06M]**
	b	Classify the various versions of raspberry pi devices till date.	[L4][CO4]	**[06M]**
3	**a**	Explain an IoT device & give some examples.	[L2][CO4]	**[06M]**
	b	Explain the GPIO pins of Raspberry Pi device with neat diagram.	[L2][CO4]	**[06M]**
4	**a**	What is a module in python? Explain with an example.	[L1][CO5]	**[06M]**
	b	Explain in brief about the Object-Oriented Programming concepts.	[L2][CO5]	**[06M]**
5	**a**	Mention the flavors of Linux OS supported by Raspberry pi device.	[L1][CO5]	**[06M]**
	b	Classify the various frequently used commands during operation of Linux OS.	[L4][CO5]	**[06M]**
6	**a**	Write a short note on various raspberry pi interfaces used for data transfer.	[L1][CO5]	**[06M]**
	b	Compare the various single board computers which are alternatives to Raspberry pi.	[L5][CO5]	**[06M]**
7	**a**	Design and Development of an automatic motion light system using raspberry pi and write a python program to support the working of that design.	[L6][CO6]	**[08M]**
	b	Illustrate how to interface a LED to raspberry pi and write a program to blink	[L3][CO6]	**[04M]**
8	Design and development of an automatic refrigerator light system with LED, switch & raspberry pi andwrite a python program to support the working of that design.		[L6][CO6]	**[12M]**
9	**a**	Explain the use of SPI and I2C interfaces on raspberry pi?	[L2][CO5]	**[06M]**
	b	Illustrate how to interface a switch to raspberry pi.	[L3][CO6]	**[06M]**
10	**a**	Illustrate how to interface a Light sensor (LDR) with raspberry pi.	[L3][CO6]	**[04M]**
	b	Design an automatic lightening system with LDR, Light and raspberry pi and write a python program to support the working of that design.	[L6][CO6]	**[08M]**

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