R16

SIDDHARTH GROUP OF INSTITUTIONS::PUTTUR
(AUTONOMOUS)
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code: Embedded Systems (16EC429)   **Course & Branch**: B.Tech - ECE
Year & Sem: IV-B.Tech & I-Sem

Regulation: R16

UNIT –I

1	a) Define embedded system.	[L1][CO1]	**[2M]**
	b) Explain the different classifications of embedded systems. Give an example for each.	[L2][CO1]	**[10M]**
2	a) List the key components of a typical embedded system.	[L1][CO1]	**[2M]**
	b) With the help of neat block diagram, Explain architecture of embedded system.	[L2][CO1]	**[10M]**
3	a) Describe the role of the following in an embedded system i) Timers ii) Clocks iii) Address bus & Data bus.	[L2][CO1]	**[6M]**
	b) List various applications of embedded systems.	[L2][CO1]	**[6M]**
4	a) What are the different types of memories used in embedded system design? Explain the role of each.	[L2][CO1]	**[6M]**
	b) What is a Programmable Logic Device (PLD)? What are the different types of PLDs? Explain the role of PLD in an embedded system design.	[L2][CO1]	**[6M]**
5	a) Differentiate SRAM & DRAM.	[L2][CO1]	**[4M]**
	b) Explain the various purposes of embedded systems in detail with examples.	[L2][CO1]	**[8M]**
6	a) What is a Digital Signal Processor? Explain the role of digital signal processor in an embedded system design.	[L2][CO1]	**[6M]**
	b) Explain briefly about typical characteristics of embedded system.	[L2][CO1]	**[6M]**
7	With a neat diagram, explain the design process of an embedded system.	[L2][CO1]	**[12M]**
8	a) List typical features of embedded systems	[L1][CO1]	**[4M]**
	b) Write a short note about the following software tools in an embedded system i) Cross-assembler ii) IDE iii) Prototyper iv) Linker	[L1][CO1]	**[8M]**
9	a) Explain in brief about the programming languages used for the development of embedded systems	[L2][CO1]	**[6M]**
	b) Explain various tools used for the development of embedded systems	[L2][CO1]	**[6M]**
10	a) Identify the components which are used for easy integration and interoperability with existing system components. Explain them in brief.	[L3][CO1]	**[4M]**
	b) Describe the role of the following processors in embedded system design i) General Purpose processor ii) Application Specific Integrated Circuits	[L2][CO1]	**[8M]**

UNIT –II

1	a) Define Processor Architecture.	[L1][CO2]	**[2M]**
	b) Describe the different processor architectures available for processor or controller design with an example for each.	[L2][CO2]	**[10M]**
2	a) List the types of memories used for program storage in an embedded system design.	[L1][CO2]	**[2M]**
	b) Briefly explain about memory architectures in embedded systems.	[L2][CO2]	**[10M]**
3	a) What is a Sensor? Explain the role of a sensor in embedded system design.	[L2][CO2]	**[3M]**
	b) With a neat sketch, describe the principle of operation of the following devices i) LED ii) 7-segment display iii) Optocoupler	[L2][CO2]	**[9M]**
4	a) What is a Actuator? Explain the role of an actuator in embedded system design	[L2][CO2]	**[3M]**
	b) With a neat sketch, describe the principle of operation of the following devices i) Stepper Motor ii) Relay	[L2][CO2]	**[9M]**
5	Write short notes on the following I/O devices i) Push Button ii) Piezo Buzzer iii) Keyboard iv) PPI	[L1][CO2]	**[12M]**
6	a) Explain the differences between I2C and SPI interface	[L2][CO2]	**[4M]**
	b) List the merits and limitations of parallel port over serial RS-232 interface.	[L1][CO2]	**[4M]**
	c) Explain the GPRS and RS-485 interfaces in embedded systems.	[L2][CO2]	**[4M]**
7	a) Compare the operation of Zigbee and Wi-Fi network.	[L2][CO2]	**[6M]**
	b) List the merits and limitations of IEEE1394 interface over USB.	[L1][CO2]	**[6M]**
8	a) Explain the sequence of operation for communicating with a 1-Wire slave device	[L2][CO2]	**[4M]**
	b) Describe the operation of UART interface in embedded system	[L2][CO2]	**[4M]**
	c) Explain how the data communication takes place using Infrared communication	[L2][CO2]	**[4M]**
9	Explain the role of following in embedded system i) Oscillator ii) Brownout Protection iii) Embedded Firmware	[L2][CO2]	**[12M]**
10	Explain the role of following circuitry in embedded system i) Reset Circuit ii) Real Time Clock iii) Watchdog Timer	[L2][CO2]	**[12M]**

UNIT –III

1	a) With the help of neat block diagram, describe the structure of Arduino UNO board.	[L2][CO3]	**[8M]**
	b) Explain in brief about the Arduino platform.	[L2][CO3]	**[4M]**
2	a) Justify, why hardware timer is needed instead of software timer.	[L5][CO3]	**[2M]**
	b) List out the features of ATMega328/P µC.	[L1][CO3]	**[10M]**
3	With neat sketch, explain block diagram of ATMega328/P µC	[L2][CO3]	**[12M]**
4	a) Write a short note on pin multiplexing.	[L1][CO3]	**[2M]**
	b) With neat sketch, explain pin functionality of ATMega328/P µC	[L2][CO3]	**[10M]**
5	a) Define is Interrupt vector and Interrupt vector.	[L1][CO3]	**[2M]**
	b) Explain in brief about the interrupts in ATMega328/P µC.	[L2][CO3]	**[8M]**
	c) What is the need of an I/O port in a µP/µC?	[L1][CO3]	**[2M]**
6	a) What is the need of a serial port in a µP/µC?	[L1][CO3]	**[8M]**
	b) Explain various alternate functions of Port B , Port C and Port D of ATMega328/P µC.	[L2][CO3]	**[4M]**
7	a) List the applications of PWM signal.	[L1][CO3]	**[2M]**
	b) What is the need of analog to digital converter in a system?	[L1][CO3]	**[2M]**
	c) List the features of ADC module in ATMega328/P µC.	[L1][CO3]	**[8M]**
8	a) Write a short note on capture block and compare blocks in a timer	[L1][CO3]	**[4M]**
	b) List the differences between timer and counter.	[L1][CO3]	**[4M]**
	c) List out the features of 8-bit timer/conter0 in ATMega328/P µC.	[L1][CO3]	**[4M]**
9	a) Define Interrupt.	[L1][CO3]	**[2M]**
	b) Explain about internal and external interrupts of ATMega328/P µC	[L2][CO3]	**[10M]**
10	a) List the features of USART module in ATMega328/P µC	[L1][CO3]	**[6M]**
	b) List out the features of Arduino uno development board.	[L1][CO3]	**[6M]**

UNIT –IV

1	a) Explain about the Arduino programming control structures with an example.	[L2][CO4]	**[8M]**
	b) Explain about the comparison operators with an example.	[L2][CO4]	**[4M]**
2	With an example each, explain the following functions in Arduino programming. (i) Digital I/O (ii) Analog I/O (iii)Advanced I/O	[L2][CO4]	**[12M]**
3	a) List various data types present in Arduino programming and explain them with the help of snippets.	[L1 & L2] [CO4]	**[8M]**
	b) Explain about various Constants in Arduino programming.	[L2][CO4]	**[4M]**
4	a) Explain the following elements of Arduino programming (i) Sketch (ii) Further Syntax	[L2][CO4]	**[8M]**
	b) Explain about the arithmetic operators with an example.	[L2][CO4]	**[4M]**
5	Explain how the data can be manipulated and accessed in Arduino programming by using the following operators with an example. (i) Boolean operators (ii) Pointer access operators (iii) Bitwise operators	[L2][CO4]	**[12M]**
6	Explain following elements of Arduino programming with an example (i) Interrupts (ii) External interrupts (iii) Communication (iv) USB	[L2][CO4]	**[12M]**
7	Explain following elements of Arduino programming with an example i) Variable scope & Qualifiers ii) Utilities iii) Conversion	[L2][CO4]	**[12M]**
8	Explain following elements of Arduino programming to perform computations i) Math ii) Time iii) Trigonometry iv) Random numbers	[L2][CO4]	**[12M]**
9	a) Explain about various functions of characters in Arduino programming	[L2][CO4]	**[6M]**
	b) Explain about compound operators in Arduino programming with an example	[L2][CO4]	**[6M]**
10	a) Write an Arduino program to display digital sensor value in serial monitor	[L1][CO4]	**[6M]**
	b) Write an Arduino program to display "Hello world" value in LCD	[L1][CO4]	**[6M]**

UNIT –V

1	a) Define IoT.	[L1][CO5]	**[2M]**
	b) List the applications of IoT	[L1][CO5]	**[12M]**
2	Explain the following i) TCP and UDP ports　　　　　　　　ii) MAC address	[L2][CO5]	**[12M]**
3	a) With the help of a neat block diagram, explain the reference architecture of IoT.	[L2][CO5]	**[10M]**
	b) Define protocol.	[L1][CO5]	**[2M]**
4	a) List the data protocols used in IoT.	[L1][CO5]	**[2M]**
	b) With necessary diagrams, describe how the MQTT protocol can exchange the data between client and server.	[L2][CO5]	**[8M]**
	c) List the applications of MQTT protocol.	[L2][CO5]	**[2M]**
5	a) List the commonly used port numbers for various application layer protocols.	[L2][CO5]	**[3M]**
	b) Describe how in real time the structured data can be exchanged with clients and servers using XMPP protocol.	[L2][CO5]	**[7M]**
	c) List the applications of XMPP protocol.	[L1][CO5]	**[2M]**
6	a) With necessary diagrams, explain how Machine to Machine applications exchange data in operated in constrained devices and constrained networks using CoAP protocol.	[L2][CO5]	**[8M]**
	b) Explain the following terms (i) DNS　　　　　　　　(ii) DHCP	[L2][CO5]	**[4M]**
7	a) Write a short note on IP address.	[L1][CO5]	**[2M]**
	b) Describe the common challenges faced while implementing IoT.	[L2][CO5]	**[10M]**
8	a) List out various level monitoring systems.	[L1][CO5]	**[2M]**
	b) Design and explain how IoT based solutions can be implemented in any one of the wireless level monitoring systems for tanks in the field and bulk storage.	[L6][CO5]	**[10M]**
9	a) Write a short note on smart home.	[L1][CO5]	**[2M]**
	b) Design and explain how IoT technologies can provide better comfort, security, privacy, flexibility of controlling appliances and management insights in our home.	[L6][CO5]	**[10M]**
10	a) Write a short note on smart farming.	[L1][CO5]	**[2M]**
	b) Design and explain a IoT based solution that can be implemented in farming for better yield of crops and maintenance of livestock.	[L6][CO5]	**[10M]**

Prepared by:

1. P PAVAN KUMAR
Assistant Professor/ECE

2. Dr R PREM KUMAR
Professor/ECE