Reg. No.															

Question Paper Code	13572

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Sixth Semester

Electrical and Electronics Engineering

20EEPW601- EMBEDDED SYSTEMS AND IOT WITH LABORATORY

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	What is the main purpose of using DMA (Direct Memory Access) in embedded systems? (a) To slow down memory access (b) To allow memory to be accessed without involving the CPU (c) To create virtual memory (d) To debug the system.	1	K1	CO1
2.	The Real Time Clock (RTC) is used for (a) Increasing CPU speed (b) Maintaining current time and date (c) Boosting battery life (d) Handling interrupts	1	K1	CO1
3.	What is the purpose of actuation in IoT? (a) Sensing environmental data (b) Processing and analyzing data (c) Performing actions based on commands (d) Visualizing data	1	K1	CO2
4.	Which of these protocols is most suitable for constrained IoT devices due to its lightweight nature? (a) HTTP (b) MQTT (c) FTP (d) TCP	1	K1	CO2
5.	Which of the following buses is known for multi-master communication? (a) SPI (b) I2C (c) RS232 (d) RS422	1	K1	CO3
6.	Which of the following is NOT a characteristic of embedded networking systems? (a) Real-time data exchange (b) Multi-device support (c) Complex graphical interfaces (d) Use of standard communication protocols	1	K1	CO3
7.	The priority inversion refer to (a) Switching task priorities randomly (b) Lower-priority task blocking a higher-priority task (c) High-priority task ignoring interrupts (d)Task changing priority to the highest	1	K1	CO4
8.	In multitasking, when the CPU switches between tasks without the tasks knowing, it is called: (a) Manual tasking (b) Cooperative multitasking (c) Context switching (d) Memory swapping	1	K1	CO4
9.	The role of weather sensors in smart agriculture is (a) Monitor livestock movement (b) Detect soil nutrients (c) Collect temperature and humidity data (d) Control pesticide levels	1	K1	CO5
10.	In a smart home, motion sensors are primarily used for: (a) Controlling temperature (b) Detecting movement for security (c) Monitoring air quality (d) Managing energy consumption	1	K1	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	Recall the need for watch dog timer.	2	K1	CO1
12.	List out the challenges in building an embedded system.	2	K1	CO1

13.	List the requirements of embedded system.		*2*	*K1*	*CO1*
14.	Explain role does cloud computing play in IoT.		*2*	*K2*	*CO2*
15.	Define sensing in the context of IoT.		*2*	*K1*	*CO2*
16.	Name two common communication protocols used in IoT.		*2*	*K1*	*CO2*
17.	Compare any two serial communication protocols.		*2*	*K2*	*CO3*
18.	Mention the features of CAN bus.		*2*	*K1*	*CO3*
19.	Define semaphore.		*2*	*K1*	*CO4*
20.	Outline the causes for deadlock in embedded system design.		*2*	*K2*	*CO4*
21.	Define Advanced Metering Infrastructure (AMI).		*2*	*K1*	*CO5*
22.	Summarize the role of IoT in healthcare.		*2*	*K2*	*CO5*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a) (i)	Explain how suitable processor and memory devices are selected for an embedded system design.	*6*	*K2*	*CO1*
	(ii)	Explain the function of timing and counting devices in embedded systems.	*5*	*K2*	*CO1*
		OR			
	b) (i)	Discuss about the structural units in embedded processor.	*6*	*K2*	*CO1*
	(ii)	With neat diagram, explain the working of Direct Memory Access (DMA).	*5*	*K2*	*CO1*
24.	a)	Explain various IoT communication protocols and their suitability for different applications.	*11*	*K2*	*CO2*
		OR			
	b)	Outline the architecture of an IoT system, detailing the roles of sensing, actuation, networking, and communication protocols.	*11*	*K2*	*CO2*
25.	a)	Write short notes on watch dog timer, CAN bus, and inter-integrated Circuits (I2C).	*11*	*K2*	*CO3*
		OR			
	b)	Explain functionalities of RS232 and RS485 standard serial interface with neat diagram.	*11*	*K2*	*CO3*
26.	a)	Explain in detail about the features and scheduling algorithm used in RTOS.	*11*	*K2*	*CO4*
		OR			
	b)	Illustrate the following task communication processes. (i) Mail box (ii) Pipes (iii) Mutex (iv) Message Queues.	*11*	*K2*	*CO4*
27.	a)	Build the case study on IoT based Home automation with examples.	*11*	*K3*	*CO5*
		OR			
	b)	Develop a case study on Embedded based Smart agriculture with examples.	*11*	*K3*	*CO5*
28.	a) (i)	Explain in detail about the Semaphore function.	*6*	*K2*	*CO4*
	(ii)	Describe how IoT and embedded systems work together in a smart grid environment.	*5*	*K2*	*CO5*
		OR			
	b) (i)	In RTOS environment, what is the meaning of shared data problem?	*6*	*K2*	*CO4*
	(ii)	Summarize the benefits and limitations of using smart meters in energy distribution.	*5*	*K2*	*CO5*