Reg. No.																

Question Paper Code	14441

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2026

Sixth Semester

Electrical and Electronics Engineering

20EEPW601 - EMBEDDED SYSTEMS AND IOT WITH LABORATORY

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART – A (i) (MCQ)
(16 × 1 = 16 Marks)
Answer ALL Questions

		Marks	*K – Level*	*CO*
1.	Find the unit in an embedded processor that performs arithmetic and logical operations. a) Control Unit b) Memory Unit c) ALU d) DMA Controller	*1*	*K1*	*CO1*
2.	Define the function of a watchdog timer in an embedded system. a) Monitor display quality b) Reset the system during software failure or hang c) Increase memory capacity d) Generate audio signals	*1*	*K1*	*CO1*
3.	Recall **t**he debugging tool used to test embedded software directly in the target system. a) Thermocouple b) In-Circuit Emulator (ICE) c) Accelerometer d) RTD	*1*	*K1*	*CO1*
4.	Explain the primary function of sensing in IoT systems. a) Data storage only b) Detecting and collecting information from the environment c) Generating mechanical motion only d) Increasing network speed	*1*	*K2*	*CO2*
5.	Discuss the importance of data handling in IoT systems. a) To delete sensor data immediately b) To process, analyze, and store large volumes of data efficiently c) To reduce communication completely d) To process, analyze, and store large volumes of data efficiently	*1*	*K2*	*CO2*
6.	Describe an important benefit of Industrial IoT. a) Increased manual intervention b) Predictive maintenance and improved efficiency c) Reduced automation d) Elimination of sensors	*1*	*K2*	*CO2*
7.	Summarize the purpose of embedded networking. a) To enable communication between embedded devices b) To increase processor size c) To reduce memory capacity d) To generate power	*1*	*K2*	*CO3*
8.	Name the bus protocol widely used in automobiles for reliable communication. a) CAN Bus b) SPI c) I2C d) RS232	*1*	*K1*	*CO3*
9.	State the expansion of I2C. a) Integrated Input Circuit b) Integrated Circuit c) Internal Interface Communication d) Intelligent Interconnect Control	*1*	*K1*	*CO3*
10.	Find a thread in an RTOS. a) Independent hardware unit b) Lightweight unit of execution within a process c) Permanent memory storage d) Communication bus	*1*	*K2*	*CO4*
11.	Apply preemptive scheduling in RTOS when a higher-priority task arrives. a) It waits until the current task finishes b) Memory gets cleared c) The system shuts down d) It interrupts the currently running lower-priority task	*1*	*K3*	*CO4*

12.	Show the priority inversion in RTOS. a) High-priority task waiting for a lower-priority task holding a resource b) Changing the processor frequency automatically c) Switching from multitasking to multiprocessing d) Reducing memory allocation	*1*	*K3*	*CO4*
13.	Employ a smart meter in an embedded system to a) Detect sound waves b) Control traffic signals c) Monitor and record energy consumption digitally d) Measure temperature only	*1*	*K3*	*CO5*
14.	Implement the technology that enables two-way communication between consumers and power utilities in a smart grid. a) Optical sensing a) Analog communication only c) Embedded networking d) Smart Grid Technology	*1*	*K3*	*CO5*
15.	Point out the application of embedded systems in health care. a) Entertainment only b) Patient monitoring and medical device control c) Mechanical power generation d) Industrial machining	*1*	*K3*	*CO5*
16.	Explain the home automation system a) Manual operation of appliances b) Automatic control and monitoring of home devices c) Industrial automation only d) Power generation process	*1*	*K3*	*CO5*

PART – A (ii) (Short Answer Questions)
(8 × 3 = 24 Marks)
Answer ALL Questions

17.	Identify the advantages of a real-time clock (RTC) in embedded systems.	*3*	*K3*	*CO1*
18.	Analyze the need for debugging the target hardware.	*3*	*K4*	*CO1*
19.	Identify the characteristics of IoT.	*3*	*K3*	*CO2*
20.	Make use of concept of data handling explain the steps involved in IoT data handling.	*3*	*K3*	*CO2*
21.	Utilize the concept of CAN bus, list the applications of CAN bus.	*3*	*K3*	*CO3*
22.	Compare multiprocessing and multitasking in embedded systems.	*3*	*K4*	*CO4*
23.	Analyze the concept of message passing in RTOS.	*3*	*K4*	*CO4*
24.	Examine the sensors used in smart agriculture.	*3*	*K3*	*CO5*

PART - B (Descriptive Answer Questions)
(5 × 12 = 60 Marks)
Answer ALL Questions

25.	a)	Construct the Structural units of Embedded Processor with neat diagram and explain each units in detail.	*12*	*K3*	*CO1*
		OR			
	b)	Develop a neat diagram to demonstrate the working of Direct Memory Access (DMA) in an embedded system.	*12*	*K3*	*CO1*
26.	a)	Classify IoT communication protocols and explain their applications in different IoT environments.	*12*	*K4*	*CO2*
		OR			
	b)	Examine the features of cloud computing that support IoT applications.	*12*	*K4*	*CO2*
27.	a)	Construct a CAN-based communication model for an embedded system application and utilize its message format and error detection features.	*12*	*K3*	*CO3*
		OR			
	b)	Construct the Inter-Integrated Circuit (I2C) protocol and discuss its addressing and data transfer mechanisms.	*12*	*K3*	*CO3*

28.	a)	Make use of concept of scheduling algorithm explain preemptive and non preemptive scheduling in RTOS and compare their advantages.	*6*	*K3*	*CO4*
		OR			
	b)	Identify the functions of the mailbox and pipe mechanisms in inter-task communication.	*12*	*K.3*	*CO4*
29.	a)	Examine the role of embedded systems in smart meter applications with suitable examples.	*12*	*K4*	*CO5*
		OR			
	b)	Examine the role of embedded systems in home automation applications.	*12*	*K4*	*CO5*