Reg. No.															

Question Paper Code	14211

M.E. / M.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

First Semester

M.E. - Embedded System Technologies

24PESPC103 - DESIGN OF EMBEDDED SYSTEMS

Regulations - 2024

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	CPU fetches the instruction from memory according to the value of _____ (a) program counter (b) status register (c) instruction register (d) program status word	1	K1	CO1
2.	What is the primary function of a Watchdog Timer (WDT)? (a) To keep track of the current time of day (b) To generate accurate time delays for user applications (c) To protect the system from malfunctions or software failures by issuing a reset (d) To provide a clock source to peripheral devices	1	K1	CO1
3.	Inter Integrated Circuit is a _____ (a) Single master, single slave (b) Multi master, single slave (c) Single master, multi slave (d) Multi master, multi slave	1	K1	CO2
4.	Which lines are used in I²C communication? (a) SDA (Serial Data) & SCL (Serial Clock) (b) RX (Receive) (c) TX (Transmit) (d) MISO and MOSI	1	K2	CO2
5.	The time between the receiver of an interrupt and its service is _____ (a) Interrupt delay (b) Interrupt latency (c) Cycle time (d) Switching time	1	K2	CO3
6.	The main drawback of the busy wait approach is (a) Simplicity of implementation (b) High CPU utilization for polling (c) More memory consumption (d) Increased throughput	1	K1	CO3
7.	Hard real time operating system has _____ jitter than a soft real time operating system. (a) less (b) more (c) equal (d) none of the mentioned	1	K1	CO4
8.	For real time operating systems, interrupt latency should be _____ (a) minimal (b) maximum (c) zero (d) dependent on the scheduling	1	K1	CO4
9.	Which tool helps find logical errors in code execution? (a) Assembler (b) Compiler (c) Debugger (d) Linker	1	K1	CO5
10.	In which EDLC phase is the software-hardware interaction defined? (a) Development (b) Testing (c) Deployment (d) Design	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	What are the main components of an embedded system?	2	K1	CO1
12.	Compare timers and counters.	2	K2	CO1
13.	Compare serial and parallel ports in terms of data transmission.	2	K2	CO2
14.	Explain two features of the RS485 protocol.	2	K2	CO2
15.	Explain with an example how a missed deadline affects the performance of a real-time system.	2	K2	CO3
16.	Describe the function of a device driver in an embedded operating system.	2	K1	CO3
17.	Explain in brief about types of RTOS.	2	K2	CO4
18.	What is shared data problem?	2	K1	CO4
19.	List the types of assemblers.	2	K1	CO5

20.		State the importance of structural and behavioural description.	2	K1	CO5
21.		What is EDLC?	2	K1	CO6
22.		What are the advantages of mobile phone hardware implementations?	2	K1	CO6

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Explain in detail the structural units in embedded processor.	11	K2	CO1
		OR			
	b)	Compare and contrast watch dog timer and real time clock.	11	K2	CO1
24.	a)	Explain how serial data transfer is performed in the I2C bus. Also, brief the steps involved in the transfer of a byte using I2C.	11	K2	CO2
		OR			
	b)	Explain the architecture and working of USB communication**.** Mention its speed categories and applications.	11	K2	CO2
25.	a)	What is the need for device driver? Explain in detail the steps involved in a device driver.	11	K2	CO3
		OR			
	b)	Explain the working of interrupts with an example and the role of context switching in multitasking embedded systems.	11	K2	CO3
26.	a)	Explain task, process and threads with flow diagram and suitable example.	11	K2	CO4
		OR			
	b)	Explain in detail about the inter-process communication mechanism.	11	K2	CO4
27.	a)	Apply the concept of in-circuit emulation to describe the steps involved in debugging an embedded hardware design.	11	K3	CO5
		OR			
	b)	Develop UML basic element diagram and the scope of UML modelling.	11	K3	CO5
28.	a)	Analyse the different phases of embedded product development life cycle (EDLC).	11	K3	CO6
		OR			
	b)	Analyse the feedback loop mechanism in an Adaptive Cruise Control system and its impact on vehicle performance.	11	K3	CO6