Reg. No.															

Question Paper Code	13504

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

Sixth Semester

Electronics and Communication Engineering

20ECEL604 - SOFTWARE FOR EMBEDDED SYSTEMS

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 primary purpose of using Embedded C? (a) To create mobile applications (b) To create operating systems (c) To program microcontrollers and develop firmware (d) To design graphical user interfaces	1	K1	CO1
2.	Which operator is used to dereference a pointer? (a) & (b) * (c) % (d) !	1	K1	CO1
3.	Which tool is used to debug C programs in Linux? (a) gedit (b) gdb (c) vim (d) nano	1	K1	CO2
4.	File required by gprof to analyze program performance: (a) a.out (b) core (c) gmon.out (d) profile.log	1	K1	CO2
5.	Peripheral typically used for implementing precise hardware timeouts is (a) GPIO (b) ADC (c) Timer (d) EEPROM	1	K1	CO3
6.	Primary role played by a header file in a C project: (a) Executes logic (b) Stores runtime variables (c) Declares functions, macros, and constants (d) Initializes hardware	1	K1	CO3
7.	sEOS is best described as (a) Preemptive multitasking OS (b) Non-deterministic scheduling OS (c) Cooperative task scheduler (d) Distributed OS	1	K1	CO4
8.	What time unit is most commonly used for scheduling tasks in sEOS? (a) Seconds (b) Milliseconds (c) Clock cycles (d) Hours	1	K1	CO4
9.	Which keyword is used for function in Python language? (a) Function (b) def (c) Fun (d) Define	1	K1	CO5
10.	What will be the result of the following expression in Python “2 ** 2 + 4 ** 2”? (a) 100 (b) 20 (c) 16 (d) 12	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	What is the purpose of gcc in embedded systems?	2	K2	CO1
12.	How is memory leak detection done using valgrind?	2	K2	CO1
13.	What is the purpose of code modularity and how it is achieved?	2	K2	CO2
14.	What is a pointer in C and how it is declared?	2	K2	CO2
15.	Outline the need for hardware delay in embedded systems.	2	K2	CO3
16.	How do loop timeouts help in real-time system reliability?	2	K2	CO3
17.	List any two features of sEOS.	2	K2	CO4
18.	Give two real-time constraints in alarm system applications.	2	K2	CO4
19.	Compare Python loops with C loops.	2	K2	CO5
20.	State two common Python exceptions.	2	K2	CO5

21.		Write a delay function using a for-loop in Embedded C.	*2*	*K2*	*CO6*
22.		What role do header files play in embedded C project?	*2*	*K2*	*CO6*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Describe in detail about the GNU configuration and build system.	*11*	*K2*	*CO1*
		OR			
	b)	Describe how the Make utility helps in automating the compilation and linking process in embedded software development.	*11*	*K2*	*CO1*
24.	a)	Explain the role of declarations, expressions and qualifiers available in C language.	*11*	*K2*	*CO2*
		OR			
	b)	Explain the different types of variable scopes in C (global, local, static, and extern) with examples. Write a C program that uses functions to demonstrate the concept of scope.	*11*	*K2*	*CO2*
25.	a)	Develop an Embedded C program for an industrial conveyor belt system that uses real-time constraints to ensure smooth operation.	*11*	*K3*	*CO3*
		OR			
	b)	Construct an embedded system for an automotive application that controls airbag deployment with strict real-time constraints.	*11*	*K3*	*CO3*
26.	a)	Apply an Embedded C program for an industrial real-time application that uses multiple timeout mechanisms.	*11*	*K3*	*CO4*
		OR			
	b)	Identify the role of hardware timeouts in industrial real-time applications. How can hardware timeouts be implemented, and what are the advantages they offer over software-based timeouts.	*11*	*K3*	*CO4*
27.	a)	Inspect the following problem statement and write a Python program that takes a dictionary where the keys are student names and the values are their grades. Print out the names of students who have passed (grade >= 50).	*11*	*K4*	*CO5*
		OR			
	b)	Examine the given problem statement and create a program that reads a file, counts the number of words in the file, and prints the word count. Handle errors if the file cannot be opened.	*11*	*K4*	*CO5*
28.	a)	Categorize how structures can be used to improve code organization and maintainability in Embedded C. Provide an example of a structure used to handle sensor data.	*11*	*K4*	*CO6*
		OR			
	b)	Examine how does the port handling work in Embedded C, and what are the best practices for organizing port configurations using header files? Explain the usage of GPIO pins with an example.	*11*	*K4*	*CO6*