

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

First Semester

M.E. - Embedded Systems Technologies

24PESPC104 - SOFTWARE FOR 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. The file extension .o represents: (a) Source file (b) Executable (c) Object file (d) Header file	1	K1	CO1
2. Which statement declares a pointer correctly? (a) int p; (b) int *p; (c) *int p; (d) p int*;	1	K2	CO1
3. In GCC, the -o option is used for: (a) Debugging (b) Output file naming (c) Optimization (d) Preprocessing	1	K1	CO2
4. The make utility uses which file by default? (a) config.mk (b) Makefile (c) setup.sh (d) build.c	1	K1	CO2
5. A hardware timeout is usually implemented using: (a) Timer interrupt (b) Nested loop (c) Polling (d) Delay counter	1	K1	CO3
6. Which C feature best supports modular programming? (a) Global variables (b) Function pointers (c) Structures (d) Inline functions	1	K2	CO3
7. Portability issues occur mainly due to: (a) Processor variations (b) Fixed-width data types (c) Endianness (d) All of the above	1	K1	CO4
8. sEOS stands for: (a) Simple Embedded Operating System (b) Small Embedded Operating Software (c) System Execution on Scheduler (d) Single Event OS	1	K1	CO4
9. The UART in sEOS is used for: (a) Parallel I/O (b) Analog input (c) Serial data exchange (d) Signal generation	1	K1	CO5
10. The function used to read data from a file in Python is: (a) get() (b) read() (c) fetch() (d) scan()	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11. What is the difference between #include <file.h> and #include "file.h"?	2	K2	CO1
12. Define the term qualifier in C.	2	K1	CO1
13. Define extern and its usage.	2	K1	CO2
14. Illustrate what happens during the linking stage of compilation.	2	K2	CO2
15. Mention any two benefits of header file usage.	2	K1	CO3
16. Illustrate hardware timeout and its importance.	2	K2	CO3
17. Define portability and explain its importance in embedded systems.	2	K1	CO4
18. How do timers support real-time task execution in embedded OS?	2	K2	CO4
19. State two memory design considerations in sEOS.	2	K1	CO5
20. List two advantages of using cooperative scheduling in sEOS.	2	K1	CO5
21. Write two advantages of using exception handling in programs.	2	K1	CO6
22. Mention two differences between C and Python conditional statements.	2	K1	CO6

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23. a) Explain the use of arrays and pointers in C with examples. 11 K2 CO1
- OR**
- b) Describe advanced data types in C with suitable examples and their uses. 11 K2 CO1
24. a) Describe the debugging and optimization process in C using GDB and valgrind. 11 K2 CO2
- OR**
- b) Explain the profiling process using gprof with suitable syntax and example output. 11 K2 CO2
25. a) Develop an example to show the important of header files in organizing project and port-specific embedded C code. 11 K3 CO3
- OR**
- b) Demonstrate how object-oriented design principles can be simulated in embedded C using function pointers and structures. 11 K3 CO3
26. a) Discuss portability issues and alternative system architectures in embedded OS design. 11 K2 CO4
- OR**
- b) Discuss on creating loop timeouts and hardware timeouts when designing an embedded system with suitable examples. 11 K2 CO4
27. a) Apply a detailed case study on the Intruder Alarm System using sEOS. Include task list, timing diagram, and communication flow. 11 K3 CO5
- OR**
- b) Demonstrate how sEOS supports multi-tasking and reliability in small embedded applications. 11 K3 CO5
28. a) Explain Python programming syntax, style, and indentation rules with examples. 11 K2 CO6
- OR**
- b) Compare Python and C programming for conditional statements and loops with suitable code snippets. 11 K2 CO6