KUMARAGURU
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Register Number:……

M.E. DEGREE EXAMINATIONS: DEC 2022

(Regulation 2018)

First Semester

EMBEDDED SYSTEMS TECHNOLOGIES

P18EST1002: Design of Embedded Systems

COURSE OUTCOMES

CO1: An ability to design a system, component, or process to meet desired needs within realistic constraints such as safety, manufacturability, and sustainability

CO2: Describe the differences between the general computing system and the embedded system, also recognize the classification of embedded systems

CO3: Design real time embedded systems using the concepts of RTOS.

CO4: Foster ability to understand the role of embedded systems in industry.

CO5: Describe the differences between the general computing system and the embedded system, also recognize the classification of embedded systems.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The counting device may be _____ device with prescalar for the clock input pulse. CO1 [K_2]

   a) Free running b) Delay

   c) Free stopping d) Control

2. Watchdog timer is a timing device its generate _____ signal CO1 [K_2]

   a) Timeout b) Timein

   c) Clockout d) Clockin

3. Bluetooth support ranges up to _____ low power and up to _____ high power. CO2 [K_2]

   a) 5m & 50m b) 10m & 50m

   c) 5m & 10m d) 10 m & 100m

4. Match the following CO2 [K_1]

List I	List II
A. Internet Enabled systems	i. ISA Bus
B. Parallel bus	ii. HTTP
C. Serial Bus	iii. Gigabit Ethernet
D. Advanced bus protocol	iv. CAN

a) A-ii, B-i, C-iv, D-iii
b) A-iii, B-ii, C-iv, D-i
c) A-i, B-ii, C-iii, D-iv
d) A-ii, B-i, C-iii, D-iv

5. Which of the following environment is soft real-time? CO3 [K_1]

a) Control system for a nuclear power plant
b) Fuel economy system in an automobile
c) Landing system in a jet airliner
d) Automobile air bag control system

6. Which one of the following is not an RTOS? CO3 [K_1]

a) VxWorks
b) PSOS
c) WINDOWS
d) QNX

7. Assertion (A): Priority inversion is a bug that occurs when a high priority task is indirectly preempted by a low priority task CO4 [K_4]
Reason (R): Enabling of interrupts leads to unbounded priority inversion

a) Both A and R are Individually true, but R is not the correct explanation of A
b) A is false but R is True
c) A is true but R is false
d) Both A and R are Individually true, and R is the correct explanation of A

8. Which one of the following method is not an on-chip emulation facility? CO4 [K_1]

a) ROM Emulator
b) JTAG
c) NEXUS
d) In-circuit emulators

9. A linker _____ the compiled codes of application software and the loader program performs the task of ____ the codes after finding the physical memory. CO5 [K_2]

a) Links & reallocating
b) Link & cross compiled
c) Reallocating & links
d) Cross compiled & Links

10. The 'model' in EDLC represents CO5 [K1]

a) The various phases in the life cycle of the product
b) The various analysis of the product
c) The various designs of the product
d) The various architecture of the product

PART B (10 x 2 = 20 Marks)

11. How does a DSP processor differ from a General Purpose Processors? CO1 [K2]
12. What do you mean by a software Timer? CO1 [K2]
13. List Features requires for device driver to perform basic functionality. CO2 [K1]
14. How vector address used for interrupt source? CO2 [K2]
15. What are the two rules that interrupt routines in an RTOS environment must follow? CO3 [K1]
16. What is priority inversion? CO3 [K1]
17. What are the software tools used in an IDE? CO4 [K1]
18. How emulators are different from simulators? CO4 [K2]
19. Why EDLC is essential in embedded product development? CO5 [K2]
20. Draw the block diagram of smart traffic light system. CO5 [K2]

PART C (6 x 5 = 30 Marks)

21. Discuss the processor specific features take into account for hardware designer for embedded system application. CO1 [K2]

22. Brief about the each field in CAN frame. CO2 [K1]

23. Compare the methods which are used for Inter-task-communication in an RTOS. CO3 [K2]

24. What are the new functions added in RTLinux? CO3 [K3]

25. List the UML basic elements required for modeling techniques. CO4 [K3]

26. Draw the block diagram of smart street light and explain. CO5 [K2]

Answer any FOUR Questions
PART D (4 x 10 = 40 Marks)

27.	Explain the Processor and Memory organization of Princeton & Harvard Architecture.	CO1	[K_2]
28.	Explain with the block diagram Internet enable embedded system communication to other systems using different protocols.	CO2	[K_2]
29.	Explain the basic functions of real time kernel. Explain the structure of TCB.	CO3	[K_2]
30.	Explain the following keywords involved in embedded software/hardware development tools: i) Compiler ii) Cross-compiler iii) In-circuit Emulator iv) Linker v) debugger	CO4	[K_2]
31.	Explain the step by step procedure for Embedded product development life cycle development.	CO5	[K_2]

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