

Reg.No.: 

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VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN  
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]  
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

**Question Paper Code: 80005**

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2025

Seventh Semester

Electrical and Electronics Engineering

U19EE727 – EMBEDDED SYSTEM

(Regulation 2019)

Time: Three Hours

Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Mention any two characteristics of embedded systems and write their significance.	2	K1	CO1
2.	Interpret the embedded software that can be used in a system.	2	K1	CO1
3.	Specify the signals associated with full-duplex serial communication protocols that use differential logic.	2	K1	CO2
4.	Differentiate between wireless and mobile system protocols.	2	K2	CO2
5.	List the various types of Intel I/O instructions.	2	K1	CO3
6.	Compare the features of user threads and kernel threads.	2	K2	CO3
7.	Illustrate the transition of tasks among the three states in the RTOS environment	2	K1	CO4
8.	Show that the shared data problem is prevented using RTOS services with an example.	2	K1	CO4
9.	List some embedded system technologies used in automotive applications to improve safety, performance, and comfort.	2	K1	CO5
10.	Recite the role of digital camera in embedded system application development.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	With a neat diagram, elucidate the structural units in an embedded processor, the selection of a processor, and the processor embedded into a system.	13	K1	CO1

		(OR)			
	b)	Demonstrate the role of embedded hardware units such as power sources, registers, memory devices, ports, timers, and interrupt controllers with the necessary schematic.	13	K1	CO1
12.	a)	Explain the functions of master and slave devices during I2C Communication and USB buses with suitable sketches.	13	K2	CO2
		(OR)			
	b)	Design a simple internet-enabled system using the required hardware devices and buses for a device network.	13	K2	CO2
13.	a)	Analyze the concept of interrupt driven I/O, non-maskable interrupts and discuss how the system prevents interrupt overrun with example.	13	K4	CO3
		(OR)			
	b)	Discuss the advantages and challenges of multithreading in modern systems, the role of scheduling in thread states and pending threads.	13	K4	CO3
14.	a)	By considering the entry/exit system of the hall, analyze the preemptive and non-preemptive scheduling algorithms in detail.	13	K1	CO4
		(OR)			
	b)	Explain the inter-process communication techniques used in a real-time operating System. Also, summarize the system-level and task service functions of priority inversion and priority inheritance with required diagrams.	13	K1	CO4
15.	a)	Apply suitable hardware and software to develop the embedded system for a smart card system application with illustrations.	13	K2	CO5
		(OR)			
	b)	Examine the step-by-step interactions among the various components of the ATM machine during a withdrawal transaction, from user initiation to transaction completion, using a sequence diagram.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	Three devices A, B, and C are connected using CAN bus and are responsible for transmitting messages with identifiers 0x323, 0x327, and 0x320, respectively	15	K2	CO2
	i. Point out the interactions in the CAN bus when all the devices A, B, and C attempt to transmit simultaneously.			
	ii. When the bus is in idle condition, can device C be successfully initiate the reception of the message with identifier 0x320.			

(OR)

b) Summarize the parallel communication using ISA, PCI, and PCI-X buses in terms of: 15 K2 CO2

- Data width, clock speed, throughput
  - Plug & play / auto-configuration
  - Bus arbitration and latency
  - Suitability for modern devices (network, storage, etc.)
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