1100ECT381122402

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S5 (Minor) Examination November 2025 (2023 Admn)

Course Code: ECT381
Course Name: EMBEDDED SYSTEM DESIGN

Max. Marks: 100 Duration: 3 Hours

PART A

(Answer all questions; each question carries 3 marks) Marks

1		What are the characteristics and quality attributes of an Embedded System?	3
2		What are the three challenges in an Embedded System Design?	3
3		Differentiate between PCI & PCI-X bus.	3
4		What is a cache memory?	3
5		Explain how a constant declaration is done in Embedded C programming with an example.	3
6		What is the difference between assembly level language and high level language?	3
7		Which are the control flow instructions in assembly language programming?	3
8		List the RISC features inherited by the ARM processor.	3
9		Draw the 3-stage pipeline architecture of ARM Processor.	3
10		Write a note on ARM Memory Interface	3

PART B

(Answer one full question from each module, each question carries 14 marks)

Module -1

11	a)	Explain the behavioural description of embedded system design.	7
	b)	What is an Embedded System? Explain the challenges in the Embedded System Development.	7
12	a)	Explain the design steps in Embedded System Design Process with a relevant example.	7
	b)	Explain the different phases of an embedded product life cycle (EDLC) with the help of a neat diagram	7

Module -2

13	a)	Explain the operation of I^2C bus.	7
	b)	Explain Serial and Parallel Port Communication with necessary diagrams.	7

14	a)	Describe the CAN bus frame structure in detail and explain the significance of each field.	7
	b)	Define interrupt latency. Discuss the factors affecting interrupt latency and methods to minimize it in embedded systems.	7

Module -3

15	a)	Explain the significance of pointers in Embedded C programming. Discuss their applications in embedded systems.	7
	b)	Write a program to use a macro to calculate the square of a number.	7
16	a)	Explain the role of preprocessor directives in Embedded C programming. Discuss common preprocessor directives with examples.	7
	b)	Write an Embedded C program to toggle an LED connected to a GPIO pin with a delay.	7

Module -4

17	a)	Explain the significance of the ARM pipeline in improving instruction execution efficiency. What are the different stages in a typical ARM pipeline?	7
	b)	Write an ARM assembly program to check if a number in R1 is even or odd and set R0 to 1 if even, or 0 if odd.	7
18	a)	Explain the ARM Processor architectures and its registers.	7
	b)	Write an ARM assembly program to perform left and right shifts on a number in R1. Store the results in R2 and R3, respectively.	7

Module -5

19	a)	What is Thumb Instruction Set? Why is it used? Explain Thumb Programmers Model.	7
	b)	Draw the model of AMBA Architecture. What are the different types of buses used in this architecture?	7
20	a)	Explain how procedures and functions are supported by ARM architecture.	7
	b)	Explain the use of memory by a standard ARM C program.	7

***