Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

EIGHTH SEMESTER B.TECH DEGREE EXAMINATION(S), OCTOBER 2019

Course Code: CS404

Course Name: EMBEDDED SYSTEMS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks.

		Marks
1	Mention the challenges in embedded computing system design	(4)
2	What is the use of specification phase in an embedded system design? Mention the components of GPS system specification.	(4)
3	Explain Control Data Flow Graph with an example	(4)
4	Explain the firmware execution flow of super loop based approach.	(4)
5	Describe mixing high level language with Assembly code with an example	(4)
6	Write short notes on (i) Simulator (ii) Emulator	(4)
7	Differentiate General purpose Operating System (GPOS) with Real time Operating system(RTOS)	(4)
8	Explain the memory model of a thread in an operating system	(4)
9	Depict four reasons to build network-based embedded systems.	(4)
10	Discuss the merits and demerits of Waterfall model for embedded system development.	(4)

PART B

Answer any two full questions, each carries 9 marks.

11		With a neat diagram explain major levels in the embedded system design process	(9)
12	a)	Imagine yourself as an Embedded System developer. A client approached your team to make an automated Coffee Vending machine. Develop requirements description of the machine.	(4)
	b)	Draw the Finite State Machine diagram for an automated Coffee Vending Machine.	(5)
13	a)	Describe the sequence diagram for a mouse click scenario.	(4)
	b)	Draw the Use case diagram for Seat Belt Warning System with explanation	(5)

PART C

Answer any two full questions, each carries 9 marks.

14 a) Describe the firmware design approaches used in an embedded product. (9)

15 a) Explain the different techniques for embedding the firmware into the target board of an embedded system? (9)

16 a) What is 'Inline Assembly' ? Explain with an example. (3)

b) Explain different types of files generated after cross – compilation (6)

PART D

Answer any two full questions, each carries 12 marks.

17 Explain the three methods of ISRs handling in the RTOSs with examples (12)

18 State the different phases of Embedded Product Development Life Cycle. Explain briefly the function of each phase. (12)

19 a) Three processes with process IDs P1, P2, P3 with estimated completion time 6, 8, 2 milliseconds respectively, enters the ready queue together in the order. Process P4 with estimated execution completion time 4 milliseconds enters the ready queue after 1 millisecond. (Assuming there is no I/O waiting for the processes) in non- preemptive SJF scheduling algorithm. (6)

Calculate the waiting time for each process and average waiting time?

(b) Describe I^2C bus structure and its transaction process. (6)

****