R22 Regulation *Subject code:4P7DC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VII Semester Regular/Supplementary Examinations, October 2026

EMBEDDED SYSTEM DESIGN

(ECE)

Maximum Marks: 60 Date: 02.11.2026 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A				
All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	BTL
1.a)	Define an Embedded System.	1M	1	1
b)	Give two examples of embedded systems used in consumer electronics.	1M	1	1
c)	What is the difference between big-endian and little-endian processors?	1M	2	1
d)	What are the advantages of PLD over fixed logic device?	1M	2	1
e)	What is meant by a SoC (System-on-Chip)?	1M	3	1
f)	Why are open standards important in embedded systems?	1M	3	1
g)	What should be the CPU utilization in a good CPU scheduling algorithm?	1M	4	1
h)	What type of multitasking is indicated when a running process is moved to the Ready state by the operating system scheduler?	1M	4	1
i)	Define Race condition?	1M	5	1
j)	What is Message queue?	1M	5	1
Part-B				
Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	Write the differentiate between general purpose computers & embedded systems.	10M	1	4
	OR			
3	Discuss the Operational and Non-Operational Quality Attributes of Embedded Systems.	10M	1	2
4	Explain the Core of an Embedded System and Discuss different types of Processors used in Embedded Systems.	10M	2	3
	OR			
5	Analyze the purpose of a Brown out protection circuit and watchdog timer in Embedded System.	10M	2	3
6	Write the difference between I2C and SPI communication interface.	10M	3	4
	OR			

7	List the major processor trends in embedded systems and state their key features with suitable examples.	10M	3	4
8	Three processes with process IDs P1, P2, P3 with estimated completion time 10, 5, 7 milliseconds respectively enter the ready queue together. Calculate the waiting time and Turn Around Time (TAT) for each process and the Average waiting time and Turn Around Time (Assuming there is no I/O waiting for the processes) in SJF algorithm.	10M	4	4
	OR			
9	Compare threads and processes in detail.	10M	4	3
10	What is deadlock? What are the different conditions favoring deadlock?	10M	5	2
	OR			
11	What is priority inversion? What are the different techniques adopted for handling priority inversion?	10M	5	2