



R22 Regulation

Subject code: E253PC1

**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**

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

**M.Tech III Semester Regular Examinations, January 2024**

**HIGH PERFORMANCE COMPUTING**

(CSE)

Maximum Marks: 60

Date:30.01.2025

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		CO	Bloom Tx level
All the following questions carry equal marks (10X1M=10 Marks)			
1.a)	What are the benefits of implementing grid computing in a network?	CO1	L2
b)	List the real-world applications of grid computing.	CO1	L2
c)	What types of applications and workloads are well-suited for cluster computing, and why?	CO2	L2
d)	Write the key characteristics that define a messaging system as lightweight?	CO2	L2
e)	How do resource management systems handle conflicts or contention for shared resources among competing jobs?	CO3	L2
f)	What are some popular examples of Cluster Operating Systems and their applications in industry or research?	CO3	L2
g)	How do ubiquitous computing and ambient intelligence contribute to the concept of Pervasive Computing?	CO4	L2
h)	How does Java's "write once, run anywhere" philosophy apply to pervasive device development?	CO4	L2
i)	What are the applications of quantum logic gates?	CO4	L2
j)	What is the Fredkin gate, and how does it differ from classical logic gates?	CO4	L2
Part-B			Bloom Tx level
Answer All the following questions. (5X10M=50Marks)			
2.	a. Elucidate key components and architecture of a grid computing system? [5M]	CO1	L2
	b. How are data grids used in scientific research data-intensive applications? [5M]	CO1	L3
OR			
3.	a. What role does middleware play in grid computing, and how does it facilitate resource management? [5M]	CO1	L2
	b. What is a computational grid, and how does it leverage distributed computing resources for computational tasks? [5M]	CO1	L2

4.	a. What is cluster computing, and how does it differ from traditional distributed computing models? [5M]	CO2	L2
	b. Discuss some examples of industries or applications where lightweight messaging systems are particularly well-suited? [5M]	CO2	L3
OR			
5.	a. How do clusters contribute to energy efficiency and sustainability in data centers? [5M]	CO2	L3
	b. What considerations are important when selecting a lightweight messaging system for a specific application or use case? [5M]	CO2	L3
6.	a. Discuss the need for job management systems in the context of high-performance computing (HPC)? [5M]	CO3	L3
	b. Explain Rigid Jobs with process migration? [5M]	CO3	L2
OR			
7.	a. Explain Dynamic Parallelism. [5M]	CO3	L2
	b. Write a note on Cluster Operating System? [5M]	CO3	L2
8.	a. Elucidate with examples the concept of Pervasive Computing? [5M]	CO4	L2
	b. Can you provide examples of real-world applications or projects that successfully leverage Java for pervasive devices? [5M]	CO4	L3
OR			
9.	a. How does Pervasive Computing enhance healthcare services and patient monitoring in real-time? [5M]	CO4	L3
	b. How does Java address the challenges of developing applications for resource-constrained pervasive devices? [5M]	CO4	L3
10.	a. What role does classical Boolean algebra play in classical logic gates, and how is it different from quantum logic algebra? [5M]	CO4	L2
	b. How is the Fredkin gate represented in terms of Boolean algebra, and what are its truth table and logic symbol? [5M]	CO4	L2
OR			
11.	a. How are quantum circuits represented visually, and what do elements like wires, qubits, and gates signify in the representation? [5M]	CO4	L2
	b. Discuss how quantum circuits are designed to implement quantum algorithms, and what considerations are important in their design? [5M]	CO4	L3