R22 Regulation *Subject code: E253PC1*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

M.Tech III Semester Regular Examinations, February 2024

HIGH PERFORMANCE COMPUTING

(Professional Elective - V)

(CSE)

Maximum Marks: 60 Date:15.02.2024 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)	Write the key characteristics of a data grid architecture?	CO1	L2
b)	How computational grids solve complex scientific problems?	CO1	L2
c)	What is the fundamental concept behind cluster computing?	CO2	L2
d)	List some examples of latest lightweight messaging protocols used in modern software development?	CO2	L2
e)	How do emerging technologies, such as edge computing and serverless architecture influence the landscape of parallel job scheduling?	CO3	L2
f)	How do cluster operating systems manage resource allocation?	CO3	L2
g)	Give some examples of real-world scenarios where pervasive computing is already making an impact?	CO4	L2
h)	What role does JVM play in running java applications on pervasive devices?	CO4	L2
i)	What are One, Two & Three Qubit Quantum Gates?	CO4	L2
j)	Explain the fundamental difference between qubits and classical bits in the context of quantum circuits?	CO4	L2

Part-B

	Answer All the following questions. (5X10M=50Marks)		Bloom Tx level
2.	a. What is grid computing, and how does it differ from other distributed computing paradigms-Elucidate? [5M]	CO1	L2
	b. How does the evolution of technology impact the capabilities and efficiency of computational grids? [5M]	CO1	L2
	OR		
3.	a. How does grid computing contribute to achieving high-performance computing capabilities for scientific Simulations and data analysis? [5M]	CO1	L2
	b. How do the data grids address the challenges of managing large-scale distributed datasets? [5M]	CO1	L2
4.	a. What are the advantages of using cluster computing for parallel processing	CO2	L2

	and high-performance computing? [5M]		
	b. What is a Lightweight Messaging System, and how does it differ from traditional messaging systems? [5M]	CO2	L2
	OR		
5.	a. What role does middleware play in cluster computing, and how does it assist in resource management? [5M]	CO2	L2
	b. How do lightweight messaging systems facilitate communication between distributed components in a software architecture? [5M]	CO2	L3
6.	a. How are job management systems utilized in the context of high-performance computing (HPC) clusters and supercomputers? [5M]	CO3	L3
	b. How does parallel job scheduling contribute to achieving high-performance computing (HPC) capabilities in clusters? [5M]	CO3	L3
	OR		
7.	a. How are resource management systems used to optimize energy efficiency in large-scale computing clusters? [5M]	CO3	L3
	b. What defines a Cluster Operating System, and how does it differ from traditional single-node operating systems? [5M]	CO3	L2
8.	a. What are the implications of Pervasive Computing in education, and how does it transform learning environments? [5M]	CO4	L2
	b. How does Java support connectivity and communication between pervasive devices in a network? [5M]	CO4	L2
	OR		
9.	a. How are machine learning and artificial intelligence integrated into Pervasive Computing systems to improve decision-making? [5M]	CO4	L3
	b. Can you discuss the advantages and limitations of using Java for Pervasive Computing compared to other programming languages? [5M]	CO4	L3
10.	a. How are classical bits and quantum bits (qubits) represented in classical and quantum logic gates, respectively? [5M]	CO4	L2
	b. How are Fredkin and Toffoli gates used in quantum computing, and what advantages do they offer over classical gates? [5M]	CO4	L2
	OR		
11.	a. How do quantum circuits contribute to solving specific computational problems more efficiently than classical circuits? [5M]	CO4	L2
	b. Can you provide examples of well-known quantum algorithms and their representations as quantum circuits? [5M]	CO4	L3