Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058, India

(Autonomous College Affiliated to University of Mumbai)

End Semester Examination (Make up)
2018-19 (July 2019)

Max. Marks: 60

Class: M.Tech. (1st Year)

Course Code: CE922

Name of the Course: High Performance Computing

Duration: 180 Min

Semester: II

Branch: Computer Engineering

Instruction:

(1) All questions are compulsory

(2) Draw neat diagrams

(3) Assume suitable data if necessary

Q No.	Question	Max. Marks	CO
Q.1 (a)	Define the following terms for Parallel Systems: i) Execution Time, ii) Total Parallel Overhead, iii) Speedup and iv) Efficiency	04	CO1
Q.1 (b)	Differentiate between Static Network Connections and Dynamic Network Connections.	08	CO2
Q.2 (a)	Discuss the MPI function *MPI_Reduce* with all functional arguments.	04	CO3
Q.2 (b)	Justify with an example of two processes that they can be executed in parallel, if they follow Bernstein's three conditions.	08	CO1
Q.3 (a)	List any four properties of tasks and inter-task interactions that affect the choice of a good mapping of tasks to processes.	04	CO3
Q.3 (b)	Demonstrate the two phases of parallel algorithm design namely partitioning and communication for Floyd's All-Pair-Shortest-Path Problem using 3×3 adjacency matrix.	08	CO3
Q.4 (a)	Define the following terms related to OpenCL: i) Work Item, ii) Index Space, iii) Work Group and iv) Private Memory	04	CO4
Q.4 (b)	Consider seven tasks with running times of 1, 2, 3, 4, 5, 5, and 10 units, respectively. Assuming that it does not take any time to assign work to a process, compute the best-case and worst-case speedup for a centralized scheme for dynamic mapping with two processes.	08	CO1
	OR		
	Calculate the maximum achievable speedup, if the number of processes is limited to (i) 1 (ii) 2, (iii) 4, and (iv) 8 for the following two task graphs.	08	CO1
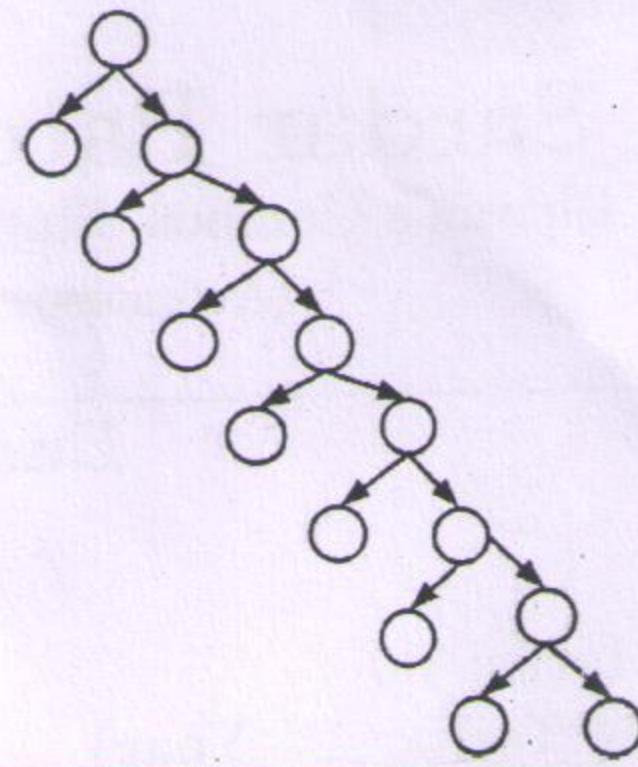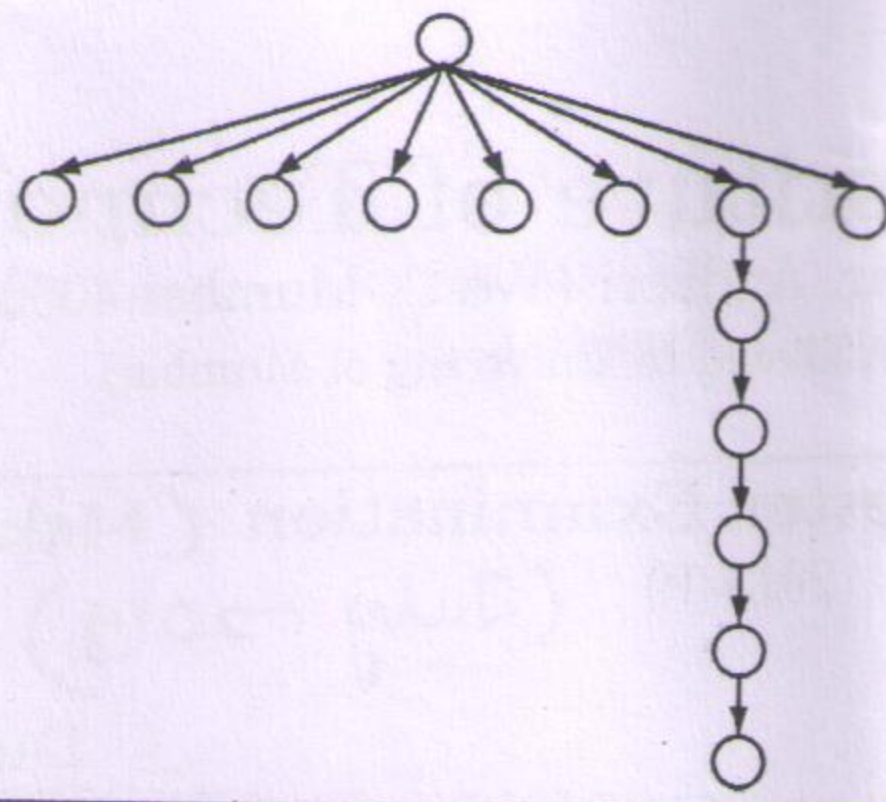
Q.5 (a)	Summarize any four requirements for a high performance communication architecture in the context of Active Messages.	04	CO2
Q.5 (b)	Exemplify Recursive Decomposition Technique with the help of Quicksort algorithm.	08	CO1
	OR		
	Exemplify Exploratory Decomposition Technique with the help of The 15-puzzle problem.	08	CO1