Program: MCA   **Semester: II**
Branch: MCA   **Session: SP2022**
Time: 2 Hrs.   **Full Marks: 50**

Instructions:
1. Attempt all the questions.
2. The missing data if any, may be assumed suitably.
3. Before attempting the question paper be sure that you have got the correct question paper.

Q1(a) "Two different implementations of the same algorithm will not differ in efficiency by more than some multiplicative constant", justify your answer with appropriate example. Define   asymptotic notation?   **[3+2 = 5]**

Q1(b) Solve the following inhomogeneous recurrence relation by converting characteristics polynomial.
$$t_n = 2t_{n-1} + n \text{ where } t_0 \geq 0$$ **[5]**

Q2(a) Explain the general principle of Greedy method and also list the applications of Greedy method.   **[5]**

**Q2(b)** What is spanning tree? Simulate and find the minimum cost spanning tree for the following graph using Prim's algorithm.   **[5]**
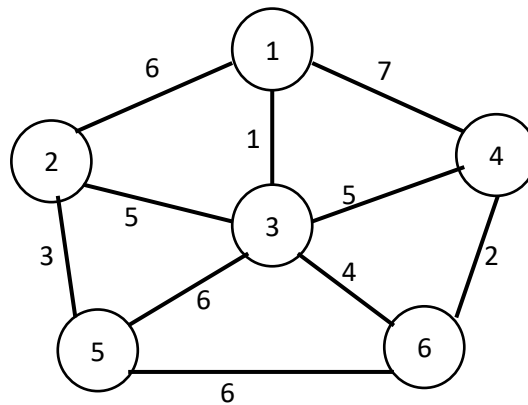
Q3(a) Discuss and explain an optimal way of job scheduling algorithm on a machine with a suitable example.   **[5]**

Q3(b) Establish with a brief analysis that worst case time complexity and average case time complexity have different orders for quick sort.   **[5]**

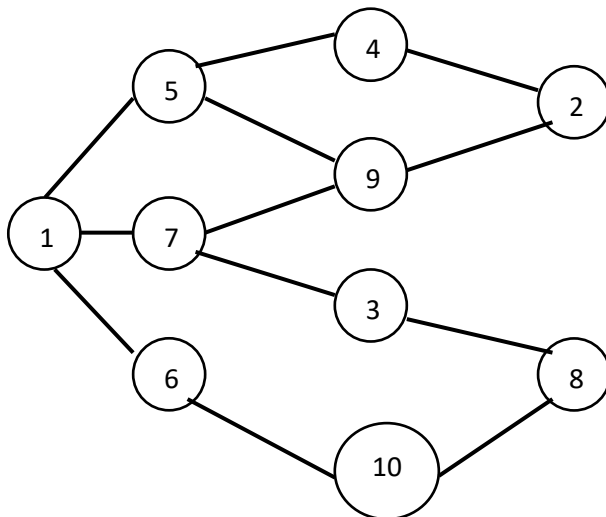**Q4(a)** Consider the graph given in the figure below. Use Floyd-Warshall algorithm to calculate the final matrix.   **[5]**
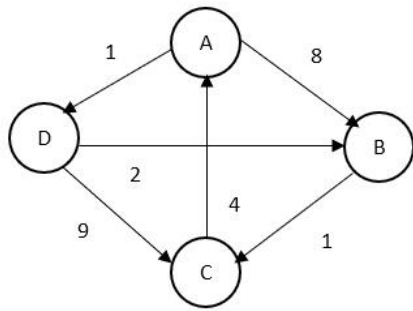
	A	B	C	D
A	0	8	∝	1
B	∝	0	1	∝
C	4	∝	0	∝
D	∝	2	9	0

Q4(b) Discuss and derive the complexity of Binary Search algorithm.   **[5]**

Q5(a) What do you mean by principal of optimality? Define memorization in Dynamic Programming.   **[2+3 = 5]**

Q5(b) Compare and contrast BFS and DFS for the following graph.   **[5]**

04/05/2022

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