## End Semester Examination (February 2022) Academic Year: 2021-2022

Max. Marks: 50 Duration: 2 Hrs.

Class: S.Y.Btech Semester: III

Course: Discrete Structures Course Code:DJ19CEC303

Program: Computer Engineering

## **Instructions:**

(1) Solve ANY FIVE questions.

(2) Read the questions carefully.

(3) Assume suitable data wherever required, but justify it.

(4) All questions carry equal marks.

(5) Answer to each new question is to be started on a fresh page.

(6) Figure to the right indicate full marks.

(7) Draw the neat labelled diagrams wherever necessary.

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Q. No.		Question	Max.
			Marks
Q1	(a)	100 sportsmen were asked whether they play cricket, football or hockey. Out of these 45 play cricket, 21 play football, 38 play hockey, 18 play cricket and hockey, 9 play cricket and football, 4 play football and hockey and 23 play none of these. Find the number of sportsmen who play exactly one of the game.	5
	(b)	Let p and q be the propositions "Swimming at the New Jersey shore is allowed" and "Sharks have been spotted near the shore" respectively. Express each of these compound propositions as an English sentence.  i) $\neg p \lor q$ ii) $p \to \neg q$ iii) $\neg q \to p$ iv) $\neg p \to \neg q$ v) $p \leftrightarrow \neg q$ Let $R = \{(1, 4), (2, 1), (2, 5), (2, 4), (4, 3), (5, 3), (3, 2)\}$ on the set $A = \{1, 4\}$	5
Q2		Let $R = \{(1, 4), (2, 1), (2, 5), (2, 4), (4, 3), (5, 3), (3, 2)\}$ on the set $A = \{1, 2, 3, 4, 5\}$ . Use Warshall's algorithm to find transitive closure of $R$ .	10
Q3	(a)	Prove by mathematical induction $5^n$ - $\mathbf{4n}$ -1 is exactly divisible by 16 for $n \ge 1$	5
	(b)	A box contains 4 white, 6 black and 5 red balls. Two balls are selected by a person. Find probability that – a) Both are of same colour b) Both are not red.	5

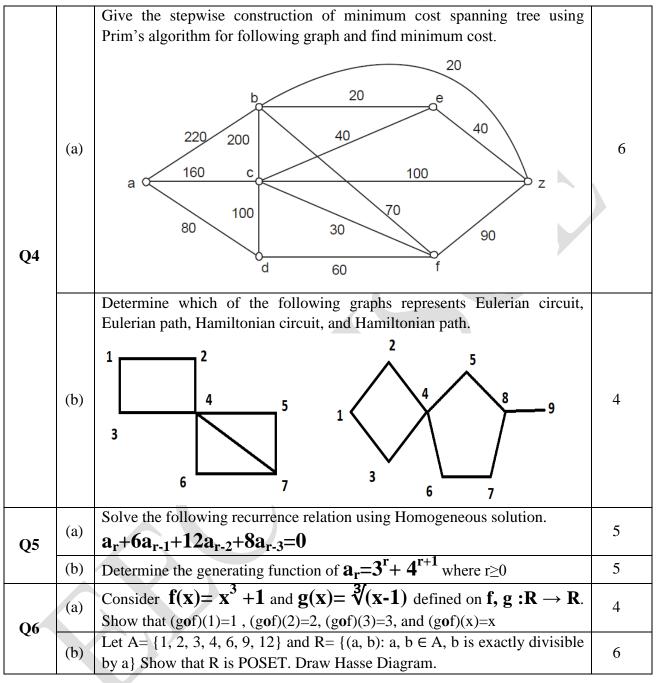


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All the Best!