



	InSem Examination-IWinter 2023		
	Exam Seat No.:		
	Academic Year: 2023-2024	Semester: III	
	Name of Programme: B.Tech Information Technology	Pattern: 2022	
	Name of Course: Discrete Mathematics	Course Code: INT222001	
	Max. Marks: 30	Duration: 1 Hr	

	<p>Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.</p> <ol style="list-style-type: none">1. This question paper contains Three page(s).2. Answer to each new question is to be started on a new page.3. Assume suitable data wherever required, but justify it.4. Draw the neat labelled diagrams, wherever necessary.5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question	
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Question No. 1 Attempt following Question

a)

Let A and B be the multisets $[a, a, b, b, c, f]$ and $[a, a, b, b, d, d]$ respectively. find

(4) CO2

(a) $A \cup B$ (b) $A - B$ (c) $B - A$ (d) $A \cap B$

OR

b)

A Survey of 70 High school students revealed that 35 like folk music, 15 like classical music and 5 like both. How many of these students surveyed do not like either folk or classical music? (4) CO2

- c) 100 out of 120 engineering students in a college take part in at least one of the activity group discussion, debate and quiz. 65 participant in group discussion, 45 participant in debate, 42 participant in quiz, 20 participant in debate and group discussion, 25 participant in group discussion and quiz. 15 Participate in debate and quiz. Find the number of students, who participate in: i) All the three activities ii) Exactly one of the activities. (5) CO2

OR

- d) Determine whether each of the following statement formula is a tautology, contradiction Or contingency.

(5) CO2

i. $(P \wedge Q) \wedge \sim (P \vee Q)$

ii. $(P \rightarrow Q) \leftrightarrow (Q \vee \sim P)$

- e) Prove the statement is true using mathematical induction: $n^3 + 2n$ is divisible by 3 for all $n \geq 1$.

(6) CO2

OR

- f) Prove that following statement are logically equivalent.

(6) CO2

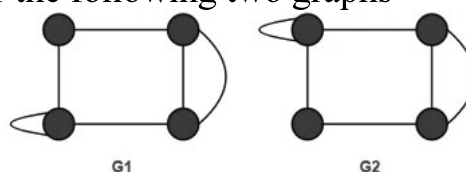
$P \rightarrow (Q \rightarrow R)$ and $(P \wedge \sim R) \rightarrow \sim Q$

Question No. 2 Attempt following Question

- a) How many regions would be in plane graph with 10 vertices each of degree 9? (4) CO1

OR

- b) Determine whether the following two graphs



(4) CO1

isomorphic or not

c)

Define the following terms with suitable example

(i) Weighted Graph (ii) Bipartite Graph (iii) Graph Coloring (5) CO1

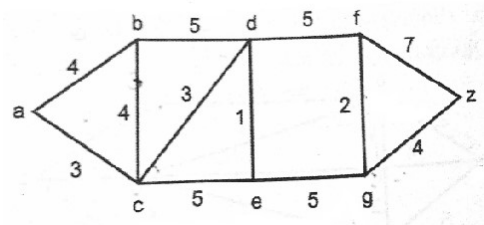
OR

d)

Determine the number of edges in a graph with 6 nodes, 2 of degree 4 and 4 of degree 2. Draw two such graphs. (5) CO1

e)

Use dijkstra Algorithm to find the shortest path between a and z.

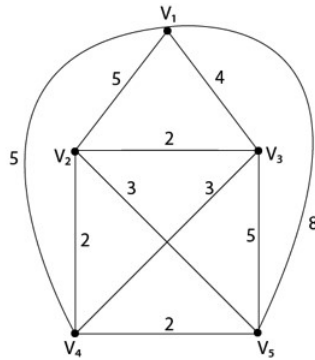


(6) CO1

OR

f)

Use the nearest-neighbor method to solve the following travelling salesman problem, for the graph shown in fig starting at vertex v_1 .



(6) CO1