K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

InSem Examination-I Winter2024	
Exam Seat No.:	
Academic Year:2024-2025	Semester:III
Class:SY	Program:B.Tech
Branch Code:INT	Pattern:2023
Name of Course:Discrete Mathematics	Course Code:2308201
Max. Marks:30	Duration: 1:15 Hrs.

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.

1. This question paper contains Two 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.

Question No. 1 Attempt following Question

1 a) Find the converse, inverse, and contrapositive of following statements   (3)   CO2

   "You will get good marks only if you study hard."

1 b) Prove the statement is true using mathematical induction: 1+2+3+---+n = n (n+1) / 2   (4)   CO2
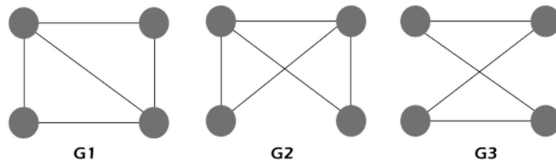
Question No. 2 Attempt following Question

2 a) Among 50 patients admitted to a hospital, 25 are diagnosed with pneumonia, 30 with Bronchitis and   (4)   CO2
   10 with both pneumonia and bronchitis. Determine:

   (a) The number of patients diagnosed with pneumonia or bronchitis (or both).

   (b) The number of patients not diagnosed with pneumonia or bronchitis.

2 b) How many integers between 1 and 1000 are divisible by 2, 3, or 5?   (4)   CO2

Group OR

2 c) Example Find out whether the following statement is logically equivalent or not.   (4)   CO2

   Statement 1: P ∨ (Q ∨ R)   Statement 2: (P ∨ Q) ∨ R

2 d) Explain types of Quantifiers. Suppose P(x) indicates a predicate where "x is a square" and Q(x) also   (4)   CO2
   indicates a predicate where "x is a rectangle". Find the universal quantifier of these predicates.
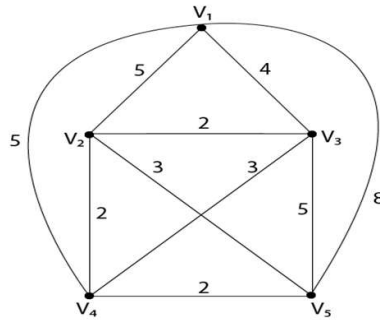
Question No. 3 Attempt following Question

3 a) Define the following terms with suitable example   (3)   CO1

   (i) Hamiltonian Graph (ii) Weighted Graph

3 b) Determine if the graphs below are isomorphic or not.   (4)   CO1
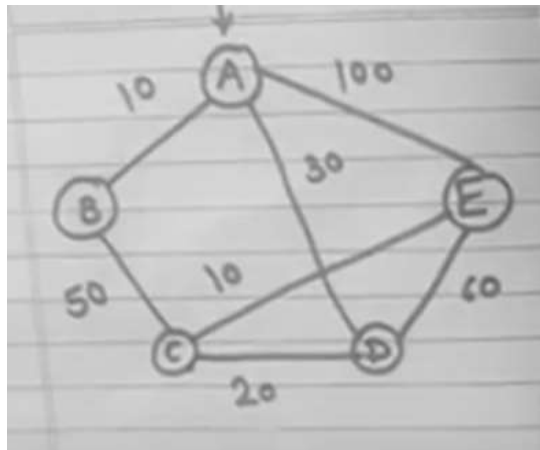
G1   G2   G3

Question No. 4 Attempt following Question

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

4 b)   Use the nearest-neighbor method to solve the following travelling salesman problem, for the graph   (4)   CO1
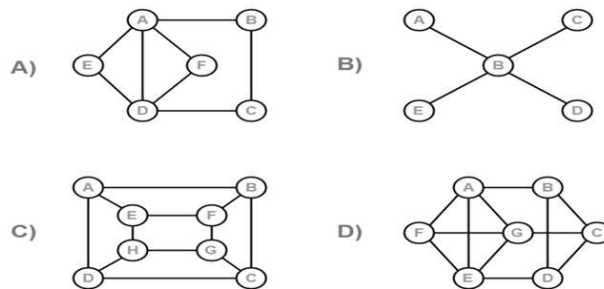shown in fig starting at vertex v1.

Group OR

4 c)   Use Dijkstra Algorithm to find the shortest path between a and z.   (4)   CO1

4 d)   Which of the following is / are Euler Graphs?   (4)   CO1

····· **End of question paper**·····