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**G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.**



**UG DEGREE END SEMESTER EXAMINATIONS - NOVEMBER 2024.**

(For those admitted in June 2023 and later)

**PROGRAMME AND BRANCH: B.Sc., INFORMATION TECHNOLOGY**

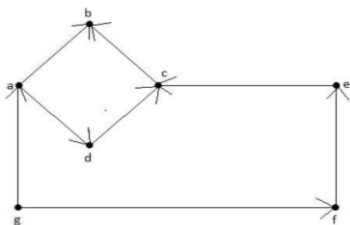
SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
III	PART - III	ELECTIVE GENERIC-3	U23IT3A3	DISCRETE MATHEMATICS

Date & Session: 14.11.2024/ AN

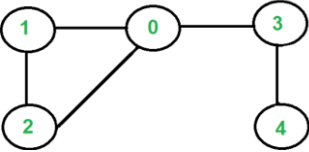
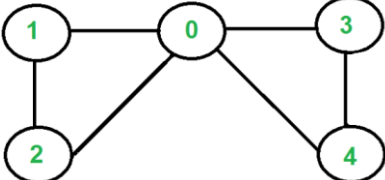
Time : 3 hours

Maximum: 75 Marks

Course Outcome	Bloom's K-level	Q. No.	SECTION - A (10 X 1 = 10 Marks) Answer <u>ALL</u> Questions.
CO1	K1	1.	Choose the correct one. Let P: I am in Bangalore; Q: I love cricket; then $p \rightarrow q$ is a) If I love cricket then I am in Bangalore b) If I am in Bangalore then I love cricket c) I am not in Bangalore d) I love cricket
CO1	K2	2.	When the compound propositions p and q are called logically equivalent if ---- is a tautology. a) $p \leftrightarrow q$ b) $p \rightarrow q$ c) $\neg (pvq)$ d) $\neg pv \neg q$
CO2	K1	3.	How many subset does a power set of empty or Null set has? a) One                                      b) Two                                      c) Zero                                      d) Three
CO2	K2	4.	Which of the following two sets are disjoint? a) {1,3,5} and {1,3,6}                      b) {1,2,3} and {1,2,3} c) {1,3,5} and {2,3,4}                      d) {1,3,5} and {2,4,6}
CO3	K1	5.	Which of the following property define the trace of the matrix? a) Sum of all the elements of the matrix b) Sum of all the elements of leading diagonal of matrix c) Sum of all non-zero elements of matrix d) Sum of all zero elements of matrix
CO3	K2	6.	The linear system $Cx = d$ is known as ----- if $d \neq 0$ . a) Homogenous    b) Heterogeneous    c) Nonhomogeneous    d) Augmented System
CO4	K1	7.	The number of edges in a regular graph of degree 46 and 8 vertices is. a) 347                      b) 230                      c) 184                      d) 186
CO4	K2	8.	Write the property of a trail in a graph. a) A walk without repeated edges                      b) A cycle with repeated edges c) A walk with repeated edges                      d) A line graph with one or more vertices
CO5	K1	9.	Which of the following problem is similar to that of a Hamiltonian path problem? a) Knapsack problem                      b) Closest pair problem c) Travelling salesman problem                      d) Assignment problem
CO5	K2	10.	What is bipartite graph? a) A graph contains only one cycle b) A graph consists of more than 3 number of vertices c) A graph has odd number of vertices and even number of edges d) A graph contains no cycles of odd length

Course Outcome	Bloom's K-level	Q. No.	<p align="center"><b>SECTION - B (5 X 5 = 25 Marks)</b>  <b>Answer ALL Questions choosing either (a) or (b)</b></p>
CO1	K3	11a.	Construct the truth table for (i) $(p \wedge q) \vee \neg q$ (ii) $(p \rightarrow q) \rightarrow \neg (q \rightarrow r)$ <b>(OR)</b>
CO1	K3	11b.	(i) Identify whether $((P \Rightarrow Q) \Rightarrow R)$ or $(P \Rightarrow (Q \Rightarrow R))$ are similar or not. (ii) Construct the truth table for "if P then Q".
CO2	K3	12a.	(i) Identify whether the relation $(x,y) \in R$ , if $x \geq y$ defined on the set of +ve integers. Find the relation for this set such as $R = \{(2,1), (3,1), (3,2), (4,1), (4,2), (4,3), (1,1), (2,2), (3,3), (4,4)\}$ (ii) Draw Hasse diagram for $\{3,4,12,24,48,72\}$ . <b>(OR)</b>
CO2	K3	12b.	Write about types of Relations.
CO3	K4	13a.	Find the inverse of the matrix $A = \begin{pmatrix} 4 & 3 & 8 \\ 6 & 2 & 5 \\ 1 & 5 & 9 \end{pmatrix}$ <b>(OR)</b>
CO3	K4	13b.	Illustrate an elementary transformation of a matrix.
CO4	K4	14a.	(i) Illustrate degree of a graph (ii) Discover the In degree and Out degree of the given graph. 
CO4	K4	14b.	Illustrate Walk, Trail and Path of a graph with an example.
CO5	K5	15a.	Explain Characteristics of tree. <b>(OR)</b>
CO5	K5	15b.	Discuss centre of a tree and steps to find the centre of a tree.

Course Outcome	Bloom's K-level	Q. No.	<p align="center"><b>SECTION - C (5 X 8 = 40 Marks)</b>  <b>Answer ALL Questions choosing either (a) or (b)</b></p>
CO1	K3	16a.	Describe connectives with an example. <b>(OR)</b>
CO1	K3	16b.	(i) Prove $X \vee Y \Leftrightarrow \neg(\neg X \wedge \neg Y)$ (ii) Prove $(X \rightarrow Y) \Leftrightarrow (\neg X \vee Y)$ (iii) Describe the Equivalence formula
CO2	K4	17a.	(i) Illustrate types of functions (ii) Consider $A = \{1, 2, 3, 5, 6, 10, 15, 30\}$ is ordered by divisibility. Determine all the comparable and non-comparable pairs of elements of A. <b>(OR)</b>
CO2	K4	17b.	(i) Illustrate the elementary operations in set theory. (ii) Prove that in a group G, if $(ab)^2 = a^2b^2$ for all $a, b \in G$ , then G is abelian. <b>(iii)</b> Let G be a group of order 15. Prove that G is cyclic.

CO3	K4	18a.	<p>(i) Infer Rank of a matrix using Echelon method</p> $\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$ <p>(ii) Infer Rank of a matrix using normal method</p> $\begin{pmatrix} 1 & 2 & 1 & 2 \\ 1 & 3 & 2 & 2 \\ 2 & 4 & 3 & 4 \\ 3 & 7 & 4 & 6 \end{pmatrix}$ <p>(iii) Illustrate properties of Rank Matrix <b>(OR)</b></p>
CO3	K4	18b.	<p>(i) Simplify the linear equations using the substitution method</p> $3x - 4y = 0$ $9x - 8y = 12$ <p>(ii) Illustrate Cayley Hamilton Theorem 2 X 2 matrix (iii) Illustrate Cayley Hamilton Theorem 3 X 3 matrix</p>
CO4	K5	19a.	<p>Discuss about types and properties of graph <b>(OR)</b></p>
CO4	K5	19b.	<p>(i) What are the types of connected graph (ii) If a complete graph has a total of 20 vertices, then find the number of edges it may contain. (iii) If a graph has 40 edges, then how many vertices does it have?</p>
CO5	K5	20a.	<p>(i) Evaluate the Eulerian path for the given graph</p>  <p>(ii) Evaluate the Eulerian cycle for the given graph</p>  <p>(iii) Explain Eulerian graph with example <b>(OR)</b></p>
CO5	K5	20b.	<p>Discuss about Hamiltonian graph and its properties.</p>