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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.C.A.

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
III	PART - III	ELECTIVE GENERIC-3	U23CA3A3	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.	Let R be a relation from A to B. The inverse of R is denoted by a) R^{-1} b) $I(R)$ c) $R(I)$ d) R^*R	
CO1	K2	2.	Relation R_R is called _____. a) Reverse Relation b) Reflexive Relation c) Reflexive Closure d) Reverse Closure	
CO2	K1	3.	The Composition of two function is _____. a) Commutative b) Associative c) Distributive d) None of the above	
CO2	K2	4.	If every element of A is assigned to the same element of B is _____. a) Identity Function b) Onto Function c) Constant Function d) Inverse Function	
CO3	K1	5.	Which of the following is not in binary logical operator? a) \wedge b) \vee c) \neg d) \rightarrow	
CO3	K2	6.	The Last Column of the truth table is T then it is called _____. a) Tautologies b) Contradiction c) Implication d) Inverse	
CO4	K1	7.	Matrix of order m by n is written as _____. a) $n \times m$ b) $m \times n$ c) n / m d) m / n	
CO4	K2	8.	_____ is said to be orthogonal matrix. a) A^0 b) A^D c) A^X d) A^T	
CO5	K1	9.	_____ associates a value (weight) with every edge in the graph. a) Directed graph b) Un Directed graph c) Weighted graph d) Un Weighted graph	
CO5	K2	10.	A graph which contains only isolated node is called a _____. a) Null graph b) Complete graph c) Directed graph d) UnDirected graph	
Course Outcome	Bloom's K-level	Q. No.	SECTION - B (5 X 5 = 25 Marks) Answer <u>ALL</u> Questions choosing either (a) or (b)	
CO1	K3	11a.	Find the composition of the relations. $R_1 = \{(1,2), (1,6), (2,4), (3,4), (3,6), (3,8)\}$ $R_2 = \{(2,x), (4,y), (4,z), (6,z), (8,x)\}$	
			(OR)	
CO1	K3	11b.	Find the reflexive closure of the relation $R = \{(1,1), (1,2), (2,1), (3,2)\}$ on the set $A = \{1,2,3\}$.	

CO2	K3	12a.	Write the function $f(x)=x+1$ for one to one. (OR)
CO2	K3	12b.	Let $f:R \rightarrow R$ be defined by $f(x) = x+1$ and $g: R \rightarrow R$ be defined as $g(x) = 2x^2 + 3$. Find $f \circ g$ and $g \circ f$. Is $f \circ g = g \circ f$?
CO3	K4	13a.	Discover the negation of the following propositions. i) Today is Sunday ii) It is a rainy day iii) If it snows, Mani does not drive the car. (OR)
CO3	K4	13b.	Comment that the proposition $p \vee \sim(p \wedge q)$ is tautology.
CO4	K4	14a.	Examine the determinant of the matrix $\begin{pmatrix} 2 & -1 & 1 \\ -15 & 6 & -5 \\ 5 & -2 & 2 \end{pmatrix}$ (OR)
CO4	K4	14b.	Focus that the matrix $A = \begin{pmatrix} -5 & -8 & 0 \\ 3 & 5 & 0 \\ 1 & 2 & -1 \end{pmatrix}$ is involutory.
CO5	K5	15a.	Prove the theorem a simple graph with $n \geq 2$ vertices contains at least two vertices of the same degree. (OR)
CO5	K5	15b.	Evaluate the number of edges of a 4 regular graph with 6 vertices.

Course Outcome	Bloom's K-level	Q. No.	SECTION - C (5 X 8 = 40 Marks) Answer ALL Questions choosing either (a) or (b)
CO1	K3	16a.	Determine the Classification of Relation with example. (OR)
CO1	K3	16b.	Let $A=\{1,2,3\}$, $B=\{a,b\}$ and $R=\{(1,a),(2,b),(3,a)\}$, Determine M_R in tabular form and in matrix forms.
CO2	K4	17a.	Analyse types of function with example. (OR)
CO2	K4	17b.	Let $X=\{a,b,c\}$. Define $f: X \rightarrow X$ such that $f=\{(a,b),(b,a),(c,c)\}$. Determine i) f^{-1} ii) f^2 iii) f^3 ii) f^4
CO3	K4	18a.	Basic set of logical operators. (OR)
CO3	K4	18b.	Construct the truth table i) $(p \wedge q) \vee (p \wedge r)$ ii) $\sim(p \vee q) \vee (\sim p \wedge \sim q)$
CO4	K5	19a.	Prove that $(AB)^T = B^T A^T$ $A = \begin{pmatrix} 1 & 2 & -1 \\ 3 & 0 & 2 \\ 4 & 5 & 0 \end{pmatrix} \quad B = \begin{pmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 0 & 1 & 3 \end{pmatrix}$ (OR)
CO4	K5	19b.	Prove that $A^3 - 4A^2 - 3A + 11I = 0$ where $A = \begin{pmatrix} 1 & 3 & 2 \\ 2 & 0 & -1 \\ 1 & 2 & 3 \end{pmatrix}$
CO5	K5	20a.	Justify that the maximum number of edges in a simple undirected graph with n vertices is $n(n-1)/2$. (OR)
CO5	K5	20b.	Predict the types of graphs with example.