22CMU208N/ 22CTU208N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Second Semester)

Common to Branches - **COMPUTER SCIENCE & COMPUTER TECHNOLOGY**

MATHEMATICS FOR COMPUTING- II

Time: Three Hours **Maximum: 75 Marks**

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	____ different sets of truth values assignments for the variables P, Q *and* R. (a) n (b) ∞ (c) 2^n (d) 2^3	K1	CO1
	2	$(P \Leftrightarrow Q) \Leftrightarrow$ _____ (a) $(P \wedge Q) \vee (\neg P \wedge \neg Q)$ (b) $(P \vee Q) \wedge (\neg P \vee \neg Q)$ (c) $(P \wedge Q) \wedge (\neg P \wedge \neg Q)$ (d) $(\neg P \wedge \neg Q)$	K2	CO1
2	3	The number of elements in A is equal to the number of elements in B is called____ (a) Equivalence set (b) equal (c) null set (d) disjoint set	K1	CO2
	4	A relation R is defined on the set of integers by R = { (a,b) : a -b is even} Then R is (a) reflexive only (b) symmetric only (c) reflexive, symmetric and transitive (d) none of these	K2	CO2
3	5	_____ function have the same domain and range (a) Composite function (b)Identity (c) Invertible (d) Cartesian	K1	CO3
	6	If f = {(1, 1), (2, 3), (3, 1), (4, 2)}, and g = {(1, 2), (2, 3), (3, 1), (4, 2)}, then g ∘ f = ____ (a) {(1, 2), (2, 1), (3, 2), (4, 3)} (b) {(1, 2), (2, 1), (3, 1), (4, 3)} (c) {(1, 2), (2, 1), (3, 4), (4, 3)} (d) {(1, 1), (2, 2), (3, 2), (4, 3)}	K2	CO3
4	7	A graph whose edge set is empty is called a _____ (a) Null graph (b) empty graph (c) disconnected graph (d) edge connected graph	K1	CO4
	8	If a graph G has more than one component then G is called ____ graph. (a) Connected (b) disconnected (c) complete (d) complete bipartite	K2	CO4
5	9	Peterson graph is _____ (a) Eulerian and Hamiltonian (b) Eulerian but not Hamiltonian (c) Hamiltonian but not Eulerian (d) Not Eulerian and not Hamiltonian	K1	CO5
	10	In a graph G , to find a closed walk running through every edge of G exactly once such a walk is called ____ (a) Hamiltonian line (b) Euler line (c) components (d) disconnected	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Constructs the truth table for the formula $(P \wedge Q) \vee (\neg P \wedge Q) \vee (P \wedge \neg Q) \vee (\neg P \wedge \neg Q)$	K3	CO1
		(OR)		
	11.b.	Verify whether $(P \to Q) \Rightarrow (\neg Q \to \neg P)$ is a tautology.		
2	12.a.	(i)Explain equivalence relation (ii) Define incidence matrix.	K2	CO2
		(OR)		
	12.b.	If $A = \{1,5\}, B = \{6,7,8,9\}$ *and* $C = \{6,7,10\}$ Show that $A \times (B \cup C) = (A \times B) \cup (A \times C)$		
3	13.a.	Let $f : A \to B$ and $g : B \to C$ be both one-one and onto functions then prove that $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$	K3	CO3
		(OR)		
	13.b.	Let A={1,2,3,4} Le R={(1,1), (1,2), (2,3),(2,4),(3,4),(4,1),(4,2)} and S={(3,1),(4,4), (2,3),(2,4),(1,1),(1,4)} be two relations on A. compute (i) Is (1,3) ε R∘R? (ii) Is (4,3) εS∘R? (iii) Is (1,1) εR∘S? (iv) S∘R, (v) R∘S		
4	14.a.	Prove that a simple graph with n vertices and k components can have at most $\frac{(n-k)(n-k+1)}{2}$ edges.	K3	CO4
		(OR)		
	14.b.	Prove that the number of vertices of odd degree in a graph is always even.		
5	15.a.	Explain shortest path problem.	K2	CO5
		(OR)		
	15.b.	Explain Fluery's algorithm to trace an Eulerian trail in an even graph.		

SECTION -C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Discuss all the connectives.	K4	CO1
2	17	Explain types of Digraph.	K3	CO2
3	18	Explain the types of relations.	K5	CO3
4	19	Discuss about the types of graphs.	K4	CO4
5	20	Prove that a connected graph G is an Euler graph if all vertices of G are of even degree.	K4	CO5

Z-Z-Z END