PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 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	A compound proposition which does not contain any connective is called _____ propostion. a) primary b) prime c) composite d) atomic	K1	CO1
	2	If a compound statement is false for all true value assignments for its component statements, then it is called a _____ a) contradiction b) exclusive c) tautology d) argument	K2	CO1
2	3	If $A = \{1,2,3,4\}$ then the relation $R_1 = \{(1,1),(2,4),(3,3),(4,1),(4,4)\}$ on A is _____ a) symmetric b) transitive c) reflexive d) not reflexive	K1	CO2
	4	A binary relation R is said to be a _____ relation, if (a,b) in R implies that (b,a) is also in R. a) Symmetric b) autosymmetric c) reflexive d) transitive	K2	CO2
3	5	Let $f : A \to B$ be a function then the set B is called _____ a) domain b) co-domain c) function d) relation	K1	CO3
	6	Which of the following function $f : R \to R$ is neither one-one nor onto function? a) $f(x) = 5x^3 - 1$ b) $f(x) = x^2$ c) $f(x) = -\sin x$ d) $f(x) = \frac{1}{x}$	K2	CO3
4	7	The _____ of a vertex v in a directed graph is the number of edges ending it. a) in degree b) degree c) incidence d) out degree	K1	CO4
	8	A graph is called a _____ graph if there are no edges. a) regular b) digraph c) weighted d) null	K2	CO4
5	9	The adjacency matrix A is _____ a) symmetric b) transitive c) reflexive d) antisymmetric	K1	CO5
	10	A complete graph K_n is planar if and only if the number of vertices, _____. a) $n < 8$ b) $n < 7$ c) $n < 5$ d) $n < 6$	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.	Make truth tables for i) $(p \downarrow q) \wedge (p \downarrow r)$ ii) $p \uparrow q \uparrow r$	K2	CO1
		(OR)		
	11.b.	Prove that conditional operation distributes over conjunction.		
2	12.a.	Describe the properties of relations with an example.	K2	CO2
		(OR)		
	12.b.	Define composition of relations and briefly explain with an example.		
3	13.a.	If R is a set of real numbers, then show that the function, $f : R \to R$ defined by $f(x) = 5x^3 - 1$ is one-one onto function.	K2	CO3
		(OR)		
	13.b.	Show that the composition of function obeys associative law.		
4	14.a.	Prove that a simple graph G with n vertices and k components cannot have more than $\frac{1}{2}(n-k)(n-k+1)$ edges.	K2	CO4
		(OR)		
	14.b.	i) Draw the complete graphs K_5 and K_6. ii) Find the number of edges in the graph K_{12} and K_{15}.		
5	15.a.	Determine the number of loops and multiple edges in a multigraph G from its adjacency matrix. $A = \begin{bmatrix} 1 & 1 & 2 & 0 \\ 1 & 2 & 1 & 3 \\ 2 & 1 & 0 & 1 \\ 0 & 3 & 1 & 0 \end{bmatrix}$ Draw the graph G and check your answer.	K2	CO5
		(OR)		
	15.b.	Show that the graph K_5 is non-planar.		

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	Show that the following statements are contingency : i) $p \Rightarrow (p \Rightarrow q)$ ii) $\sim (p \vee q) \wedge (\sim p \vee \sim q)$ iii) $(p \Rightarrow (q \wedge r)) \Rightarrow \sim (p \Rightarrow q)$	K4	CO1
2	17	Let R be an equivalence relation on a non-empty set A. Let a and b be arbitrary elements in A. Then Prove that i) $b \in [a] \Leftrightarrow [b] = [a]$ ii) $[a]=[b]$ if and only if $(a,b) \in R$. iii) equivalence classes determined by a and b are either disjoint or identical.	K3	CO2
3	18	If $f : A \to B$ and $g : B \to C$ are two one-one onto functions, the prove that i) is got one-one onto ii) $g \circ f$ is invertible iii) the product of any function with identity function is function itself.	K3	CO3
4	19	Define Isomorphic graph and explain with an example of isomorphic and non-isomorphic graph.	K3	CO4
5	20	In a complete graph G with n (an odd number) ≥ 3 vertices, there are $(n-1)/2$ edge-disjoint Hamiltonian circuits.	K4	CO5

Z-Z-Z END