PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2023
(Second Semester)

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

MATHEMATICS FOR COMPUTING - II

Time: Three Hours   Maximum: 50 Marks

SECTION-A (5 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks   (5 x 1 = 5)

1 If a proposition is neither a tautology nor a contradiction, then it is called a _____.
   - (i) contingency
   - (ii) conditional
   - (iii) biconditional
   - (iv) disjunction

2 The range of the function is the set of _____.
   - (i) images
   - (ii) real numbers
   - (iii) domain
   - (iv) ordered pairs

3 A function f is invertible (inverse of f exists) if and only if f is a _____.
   - (i) conjunction
   - (ii) bijection
   - (iii) convex
   - (iv) non-negative

4 A graph in which loops and parallel edges are allowed is called _____.
   - (i) simple graph
   - (ii) multigraph
   - (iii) pseudograph
   - (iv) complete graph

5 A graph containing an Eulerian circuits is called an _____.
   - (i) Eulerian path
   - (ii) Eulerian graph
   - (iii) Hamiltonian path
   - (iv) Hamiltonian circuits

SECTION - B (15 Marks)
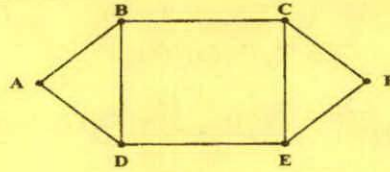Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks   (5 x 3 = 15)

6 a Define conditional and biconditional prepositions with examples.

   OR

   b Construct a truth table: $(p \lor q) \to (p \land q)$.

7 a If $P = \{a, b, c\}$ and $Q = \{r\}$, form the sets $P \times Q$ and $Q \times P$. Are these two products equal.

   OR

   b Let $A = \{1,2,3\}$, $B = \{3,4\}$ and $C = \{4,5,6\}$. Find $A \times (B \cap C)$.

8 a Provide the 3 requirements, to say the two functions f and g as equal functions.

   OR

   b Find the domain and the range of the real function, $f(x) = 1/(x + 3)$.

9 a The number of vertices of odd degree in an undirected graph is even prove it.

   OR

   b If all the vertices of an undirected graph are each of odd degree k, then show that the number of edges of the graph is a multiple of k.

10 a Find all the simple paths from A to f and all the circuits in the graph:

OR

b Define Eulerian graph and Hamiltonian graph with example.

SECTION -C (30 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** Marks   (5 x 6 = 30)

11 a Explain the basic logical operations with examples.

OR

b Check whether the following compound preposition are tautologies or contradiction, using truth table: $((p \rightarrow q) \wedge (q \rightarrow r)) \rightarrow (p \rightarrow r)$.

12 a Prove that $(A - C) \cap (C - B) = \varphi$ analytically and graphically, where A, B, C are sets.

OR

b If R is the relation on the set of ordered pairs of positive integers such that (a, b), (c, d) $\in$ R whenever ad = bc, then show that R is an equivalence relation.

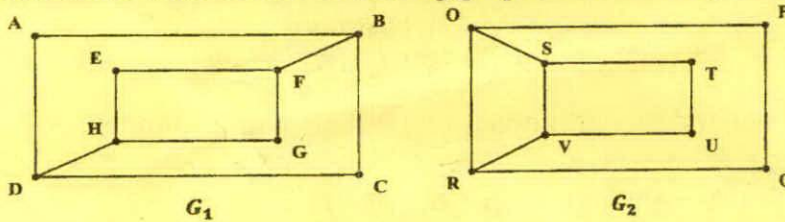13 a Let f: R $\rightarrow$ R: f(x) = 4x + 3 for all x $\in$ R. Show that f is invertible and hence find f -1

OR

b If f: A $\rightarrow$ B and g: B $\rightarrow$ C are invertible functions, then prove that g o f : A $\rightarrow$ C is also invertible and (g o f) -1 = f-1 o g-1.
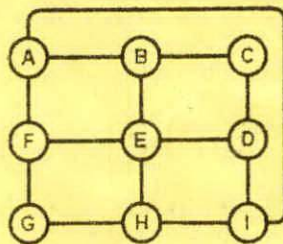
14 a State and prove Hand shaking theorem.

OR

b Determine whether the following graphs are isomorphic.

15 a In the following graph, there are 9 nodes. Check whether this graph is a Hamiltonian graph or not.

OR

b Explain the following operations of graphs with examples.
(i)union   (ii)intersection   (iii) product

Z-Z-Z   END