

**B.SC. (A & G) SEM. – II (ANIMATION & GAMING) (CBCS -  
2015 COURSE) : WINTER - 2017**

**SUBJECT: MATHEMATICS FOR COMPUTING**

Day: **Tuesday**  
Date: **26/12/2017**

**W-2017-0888**

Time: **02.30 PM TO 05.30 PM**  
Max Marks: **60**

**N.B:**

- 1) Attempt **ANY SIX** questions.
- 2) Figures to the right indicate **FULL** marks.

- Q.1**
- a) Let p denote “He is rich”, and q denote “He is happy”. Write each of the following statements in symbolic form using p and q: (04)
    - i) If he is rich, then he is unhappy.
    - ii) It is necessary to be poor in order to be happy.
    - iii) He is neither rich nor happy.
    - iv) To be poor is to be unhappy.
  - b) Rewrite the following statements without using the conditional, both symbolically and in plain language: (06)
    - i) If it is cold, he wears a hat.
    - ii) If productivity increases, then wages rise.

- Q.2**
- a) Determine the validity of the argument (04)  
 $p \rightarrow q, \neg p \vdash \neg p$
  - b) Determine the validity of the following argument: (06)  
If 7 is less than 4, then 7 is not prime.  
7 is not less than 4  
7 is prime

- Q.3** The weight matrix W of a graph whose vertices are A, B, C, D, E is as shown:

$$W = \begin{bmatrix} 0 & 100 & 200 & 150 & 175 \\ 100 & 0 & 125 & 250 & 225 \\ 200 & 125 & 0 & 300 & 275 \\ 150 & 250 & 300 & 0 & 75 \\ 175 & 225 & 275 & 75 & 0 \end{bmatrix}$$

- a) Explain whether the graph admits an Eulerian circuit. (04)
  - b) Starting at vertex A, apply the nearest neighbor algorithm to find a Hamiltonian circuit and find its weight. (06)
- Q.4** A graph G is defined by the vertex set  $V(G) = \{a, b, c, d, e, f\}$  and the edge set  $E(G) = \{(ab, 4), (ac, 3), (bd, 1), (bc, 1), (ce, 1), (de, 1), (df, 2), (ef, 2)\}$ . The number following each edge is the weight of the edge.
- a) Draw the graph. (02)
  - b) Apply Kruskal's algorithm to G. List the edges of the tree that is grown, in the order they are added and draw the tree. (06)
  - c) What is the weight of minimum spanning tree in G? (02)
- Q.5**
- a) Define the following terms: (04)
    - i) Binary tree
    - ii) Binary search tree
    - iii) Height of a binary tree
    - iv) Leaf
  - b) Construct a binary search tree from the following data set of 12 elements. (06)  
Ensure that the tree is as balanced as possible. What is the height of the tree?  
50 30 25 75 82 28 63 70 04 43 74 35

**P.T.O**

- Q.6 a)** Find all solutions to the following system of Linear equation using matrix method:- **(06)**  
 $x - 2y + 2z = 5$   
 $x - y = -1$   
 $-x + y + z = 5$

- b)** Can a matrix have 5 (five) elements? If YES, give an example, and state the order of the matrix. If NO, give reasons why. **(04)**

**Q.7** Given the matrix  $A = \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$

- a)** Find eigenvalues of A. **(04)**  
**b)** Which are the corresponding eigenvectors. **(06)**

- Q.8 a)** Find all complex number of the form  $z = a + bi$ , where a and b are real numbers such that  $z \cdot z' = 25$  and  $a + b = 7$ , when  $z'$  is the complex conjugate of z. **(04)**  
**b)** Apply D'Moivre's theorem to compute the cube roots of -8. **(06)**

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