

**B.Sc. (A & G) Sem. – II (Animation & Gaming) (CBCS - 2015
COURSE) : WINTER - 2018
SUBJECT- MATHEMATICS FOR COMPUTING**

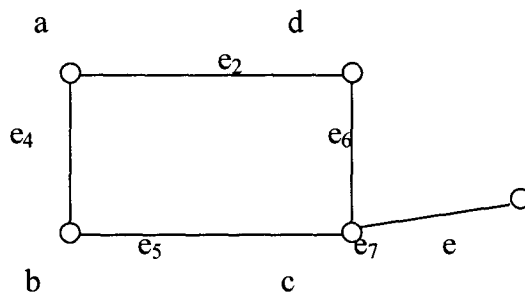
Day: Thursday
Date: 22/11/2018

W-2018-1119

Time: 02.30 pm to 05.30 pm
Max Marks: 60

- 1) Attempt **ANY SIX** questions.
- 2) Make assumptions **where** required, stating your assumption clearly.
- 3) Use of calculator is **NOT** allowed.
- 4) Figures to the right indicate **FULL** marks.

- Q.1 a)** Use De Morgan's Laws to write the negation of the expression, and translate the negation in English: **(04)**
- i) "I like Mathematics and I like Computer Science".
 - ii) "Either that clock is slow or this class is dragging on".
- b)** Test the validity of the argument symbolically and using truth table: **(06)**
- If Bush is president, then a Republican is president.
A Republican is president.
Therefore, Bush is president.
- Q.2 a)** Prove the following argument is valid: $p \rightarrow \neg q, r \rightarrow q, r \vdash \neg p$. **(04)**
- b)** Express the following English statement symbolically using quantifiers. **(06)**
- i) Every cat is sleeping.
 - ii) Some girl likes David.
 - iii) No one is happy.
- Q.3 a)** Define adjacency and incidence matrix. Find adjacency and incidence matrix of the following graph. **(05)**



- b)** The characters a to h have the set of frequencies based on the first 8 Fibonacci numbers as follows: **(05)**
- a:1; b:1; c:2; d:3; e:5; f:8; g:13; h:21
- Construct a Huffman code for the letters. What is the sequence of characters corresponding to the following code?
- Q.4 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)**
- What is the height of the tree?

50 30 25 75 82 28 63 70 04 43 74 35

P.T.O.

Q.5 Given the matrix:

$$\begin{bmatrix} 3 & 1 & -1 \\ 2 & -2 & 0 \\ 1 & 2 & -1 \end{bmatrix}$$

- a) Compute the minor and cofactor of the above matrix. (05)
- b) Calculate the inverse of the given matrix. (05)

Q.6 a) Verify that $(AB)^{-1} = B^{-1} A^{-1}$ for the matrices $A = \begin{pmatrix} 2 & 1 \\ 5 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 4 & 5 \\ 3 & 4 \end{pmatrix}$ (06)

b) Given the matrix $A = \begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$, find eigen values of A. (04)

Q.7 a) Solve the following system of equations by:

- i) Gauss Elimination Method (05)
- ii) Gauss Jordan Method (05)

$$\begin{aligned} x + y + z &= 9 \\ x - 2y + 3z &= 8 \\ 2x + y - z &= 3 \end{aligned}$$

Q.8 In the context of Complex Numbers:

- a) State De Moivre's Theorem. (02)
- b) Apply De Moivre's theorem to compute the cube root of -8. (04)
- c) Apply De Moivre's theorem to compute the fifth root of $(\sqrt{3} + 1)^5$. (04)

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