

**B.SC. (A & G) SEM. – II (ANIMATION & GAMING) (CBCS -
2015 COURSE) : SUMMER - 2018**

SUBJECT: MATHEMATICS FOR COMPUTING

Day: **Thursday**
Date: **17/05/2018**

S-2018-0995

Time: **10.00 am to 01.00 pm**
Max Marks: **60**

N.B:

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

- Q.1 a)** Represent each of the following statements symbolically and negate. Rewrite the negated statements in plain language: **(06)**
i) If the teacher is absent, then some students do not complete their assignment.
ii) All students complete their assignment and the teacher is present.
iii) Some students did not complete their assignment or the teacher is absent.
- b)** Let $A = \{1, 2, 3, 4, 5\}$. Determine the truth value of each of the following statements: **(04)**
i) $(\exists x \in A) (x+3=10)$
ii) $(\exists x \in A) (x+3 < 5)$
- Q.2 a)** Determine the truth value of each of the following $U = \{1, 2, 3\}$ is the universal set:- **(06)**
i) $\exists x \forall y, x^2 < y+1$
ii) $\forall x \exists y, x^2 + y^2 < 12$
- b)** Test the validity of the following argument: **(04)**
If two sides of a triangle are equal, opposite angles are equal.
Two sides of a triangle are not equal.
The opposite angle are not equal.
- Q.3** Consider the following graph $G(V, E)$; $V = \{v_1, v_2, v_3, v_4, v_5, v_6, v_7\}$;
 $E = \{v_1v_3, v_1v_5, v_2v_3, v_2v_5, v_3v_5, v_3v_7, v_4v_5, v_4v_7, v_5v_7, v_5v_6, v_6v_7\}$
- a)** Draw the graph. **(03)**
b) Does G have an Eulerian circuit? Explain. **(02)**
c) Write an Euler circuit for G starting and ending at v_1 if an Eulerian circuit exists. **(05)**
- Q.4 a)** For a binary tree with N nodes:- **(04)**
i) What is the maximum height (depth)?
ii) What is the minimum height?
iii) What is the maximum number of leaves possible?
- b)** The pre-order and in-order traversals of a binary tree are as shown. Reconstruct the tree. **(06)**
Pre- order: A-B-D-E-F-C-G-H-J-L-K
In – order: D-B-F-E-A-G-C-L-J-H-K
- Q.5 a)** Suppose data items A,B,C,D,E,F,G occur with the following frequency of distribution: **(08)**
Date item: A B C D E F G
Frequency: 10 30 5 15 20 15 5
Find Huffman code for the data.
- b)** State the handshaking lemma (theorem). **(02)**
- Q.6 a)** Show that the vectors $u = [6, 2]^T$ and $v = [-1, 3]^T$ are orthogonal. **(04)**
b) Solve the following system of linear equations using matrix method. **(06)**
 $2x - y = -1$
 $x + 3y - z = 5$
 $y + 2z = 5$

P.T.O

Q.7 a) Verify that $(AB)^{-1} = B^{-1} A^{-1}$ for the matrix $A = \begin{bmatrix} 2 & 1 \\ 5 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 5 \\ 3 & 4 \end{bmatrix}$ **(06)**

b) What is rank of a matrix? How can you determine if a system of equations is consistent from its rank? **(04)**

Q.8 a) Compute the absolute value and conjugate of
i) $z = (1+i)^6$; ii) $w = i^{17}$ **(08)**

b) State De Moivre's theorem for complex numbers. **(02)**

* * *