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**BO—10—2016**

**FACULTY OF COMPUTER STUDIES**

**B.C.A. (Second Year) (Third Semester) EXAMINATION**

**OCTOBER/NOVEMBER, 2016**

**(Revised Course)**

**COMPUTER APPLICATION**

**(Mathematical Techniques in Computer Science)**

**(Saturday, 19-11-2016)**

**Time : 2.00 p.m. to 5.00 p.m.**

*Time— Three Hours*

*Maximum Marks—80*

- N.B. :—*
- (i) All questions are compulsory.
  - (ii) Figures to the right indicate full marks.
  - (iii) Question No. 1 is compulsory. Attempt either (A) or (B) from Question No. 2 to Question No. 4.
  - (iv) Use suitable data, if necessary.

1. Attempt the following : 20

- (a) Explain Venn diagram.
- (b) Construct the truth table for the following statement :  
 $(\sim p \wedge q) \rightarrow (p \vee q)$ .
- (c) Describe transpose of matrix.
- (d) Find the distance between the following pair of points :  
A(6, -1) and B(-2, 3).

2. (A) Attempt the following :

- (a) Explain validity of arguments.

7

P.T.O.

(b) If

$A = \{4, 8, 9, 10\}$ ,  $B = \{2, 3, 6, 8\}$  and

$C = \{0, 3, 5, 7, 9\}$  and

$U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

then find :

8

(i)  $(A \cap B) \cup C$

(ii)  $(A - B) \cup (B - C)$

(iii)  $(A \cap B)'$

(iv)  $(A - C) \cap B.$

Or

(B) Attempt the following :

(c) Explain equations of circle.

7

(d) Find the second order partial derivative of the function :

$$z = 7x^3 - 8xy^2 + 3y.$$

3. (A) Attempt the following :

(a) Explain isomorphism of graphs.

7

(b) Find the adjoint of matrices :

8

(i)  $A = \begin{bmatrix} 4 & 1 \\ 6 & -3 \end{bmatrix}$

(ii)  $A = \begin{bmatrix} 1 & 3 & -1 \\ 6 & 5 & 2 \\ 1 & 3 & 4 \end{bmatrix}.$

Or

(B) Attempt the following :

(c) Define function and explain its type. 7

(d) Find the equation of line which is passing through the two points  
(4, -2) and (7, 3). 8

4. (A) Attempt the following :

(a) Explain Binary number system. 7

(b) Show that the following pair of statements are logically  
equivalent : 8

$$p \wedge (q \vee r); (p \wedge q) \vee (p \wedge r).$$

Or

(B) Attempt the following :

(c) Define graphs and explain its types. 7

(d) If 8

$$A = \begin{bmatrix} 1 & 9 & 6 \\ 3 & -2 & 4 \\ 2 & 6 & 3 \end{bmatrix} \text{ and } B = \begin{bmatrix} 2 & 0 & 4 \\ 6 & 3 & 1 \\ -2 & 1 & 5 \end{bmatrix}$$

then find :

(i)  $A + B$

(ii)  $A - B$

(iii)  $A \cdot B$ .

P.T.O.

5. Write short notes on any *three* of the following : 15

- (a) Real numbers and complex numbers
- (b) Sets
- (c) Cartesian product
- (d) Connected and disconnected graphs
- (e) Walk, path and circuit.