Reg. No. ☐☐☐☐☐☐☐☐☐☐

BCACAC 208

Credit Based Third Semester B.C.A. Degree Examination, Oct./Nov. 2014
(New Syllabus) (2013-14 Batch Onwards)
BASIC MATHEMATICS

Time : 3 Hours

Max. Marks : 80

Note : Answer **any ten** questions from Part – **A** and **one full** question from **each** Unit from Part – **B**.

PART – A   (10×2=20)

1. a) Represent the following in logarithm format

   i) $2^4 = 16$

   ii) $\sqrt[3]{8} = 2$

   b) Find how many four letter words can be formed out of the word LOGARITHMS.

   c) Write distance formula.

   d) If A = {a, b}, B = {1, 2, 3} write A × B and B × A.

   e) Define proper subset. Give example.

   f) Define power set. Give example.

   g) Find $\lim_{x \to 1} \left(\dfrac{4x^4 + 3x^2 - 1}{x^3 + 7} \right)$.

   h) Show that the function $f(x) = x^3$ and $g(x) = x^{1/3}$ for $x \in R$ are inverse of one another.

   i) If $y = 4x^3 - 7x^4$ then find $\dfrac{dy}{dx}$.

   j) Represent the following in radians :

   i) 225°   ii) 135°

   k) Define Multigraph with example.

   l) Define

   i) Null graph   ii) Loop.

P.T.O.

PART – B
Unit – I

2. a) Prove that $\log\dfrac{81}{8} - 2\log\dfrac{3}{2} + 3\log\dfrac{2}{3} + \log\dfrac{3}{4} = 0$.

   b) Show that the points (6, 6), (2, 3), (4, 7) are the vertices of a right angled triangle.

   c) Give general equation of tangent and radius of circle. Find the equation of circle whose centre is (4, 5) and which passes through centre of circle $x^2 + y^2 + 4x + 6y - 12 = 0$.   **(5+5+5)**

3. a) If $\log_2 x + \log_4 x + \log_{16} x = \dfrac{21}{4}$ then find x.

   b) Find the middle terms in the expansion $\left(3x - \dfrac{2x^2}{3}\right)^7$.

   c) Find the equation of the straight line passing through the point (–3, 1) and perpendicular to the line $5x - 2y + 7 = 0$.   **(5+5+5)**

Unit – II

4. a) If $\tan\theta = \dfrac{4}{5}$ find the value of $\dfrac{2\sin\theta + 3\cos\theta}{4\cos\theta + 3\sin\theta}$.

   b) Prove that the function $x^2 + 4x - 2$ is continuous at $x = 1$.

   c) Integrate $\displaystyle\int_{-1}^{1}(2x^2 - x^3)dx$.   **(5+5+5)**

5. a) Prove that $4(\sin^4 30° + \cos^4 60°) - 3(\cos^2 45° - \sin^2 90°) - 2 = 0$.

   b) Evaluate : $\displaystyle\lim_{x\to 2}\left(\dfrac{2x^2 - 7x + 6}{5x^2 - 11x + 2}\right)$.

   c) Differentiate : $(3x^2 + 5)(2x^3 + x + 7)$ with respect to x.   **(5+5+5)**

Unit – III

6. a) Write $A \times B \times C$, B^2, A^3, $B^2 \times A$, and $A \times B$ where $A = \{1, 4\}$ $B = \{4, 5\}$ $C = \{5, 7\}$.

   b) Let $R = \{(1, 2), (3, 4), (2, 2)\}$ and $S = \{(4, 2), (2, 5), (3, 1), (1, 3)\}$. Find $R \circ S$, $S \circ R$, $R \circ R$, $R \circ (S \circ R)$, $R \circ R \circ R$.

   c) $P = \{< 1, 2 >< 2, 4 >< 3, 3 >\}$ $Q = \{<1, 3 >< 2, 4 >< 4, 2 >\}$. Find $D(P)$, $D(Q)$ $D(P \cup Q)$, $R(P)$ and $R(P \cap Q)$.   **(5+5+5)**

7. a) Given the relation matrices M_R and M_S. Find MROS, $M_{\tilde{R}}, M_{\tilde{S}}, M_{\tilde{R \circ S}}$ and show

$$\text{that } M_{\tilde{R \circ S}} = M_{\tilde{S} \circ \tilde{R}} \quad M_R = \begin{bmatrix} 1 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix} \text{and } M_S = \begin{bmatrix} 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 \end{bmatrix}.$$

b) Let $x = \{1, 2, 3, 4\}$ and $R = \{(x, y) \mid x > y \}$. Draw the graph of R and also give its matrix.

c) Define Surjective Injective and Bijective functions with example.   (5+4+6)

Unit – IV

8. a) Define the following with example.

    i) Digraph

    ii) Isomorphic graphs

    iii) Parallel edges

    iv) Weighted graph

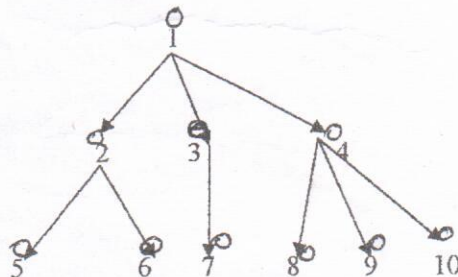b) Explain Binary tree with suitable diagram and example.

c) With example explain the terms path reachability and connectedness with suitable examples.   (6+4+5)

9. a) Define the following terms with example.

    i) Total degree   ii) Directed tree

    iii) Elementary path   iv) Length of path

b) Define a directed tree and binary tree. Give example.

c) Convert the following tree to binary tree.

    (6+4+5)