April - 2015

B.B.A. Semester – 1

Paper – 105: Business Maths – I

Time: 2 ½ Hours 2580 **Total Marks: 70**

Q.1 (a) Explain following terms with example: [7]

(i) Proper subset (ii) Power set (iii) Universal set (iv) Intersection of two sets.

Q.1 (b) If U = N, A = {2x | x ∈ N} and B = {4x | x ∈ N} then find A ∪ B, A ∩ B and A Δ B. [7]

OR

Q.1 (a) State distributive laws and verify them for the following sets: [7]

A = {1, 2, 3, 4}, B = {2, 4, 6, 8} and C = {3, 4, 5, 6}

Q.1 (b) In a class of 300 students, 210 passed in Mathematics and 150 passed in Statistic. If 60 of them failed in both mathematics and statistics, find the percentage of students who have passed in both. [7]

Q.2 (a) Explain with example: [7]

(i) Even function (ii) Odd function (iii) Linear function (iv) Constant function

Q.2 (b) Find the break-even point and the equilibrium price for the following demand and supply curves respectively: [7]

$D = 5 + 2p - 3p^2$ $S = p^3 + p + 2$.

OR

Q.2 (a) Find the total revenue function for the following. Also find the total revenue at the point mentioned: [7]

i) $D = 5 - p + \frac{4}{p^2}$, $p = 2$.

ii) $P = 30 + 10x - x^2$, $x = 4$.

Q.2 (b) If $f(x)=\frac{3x+4}{5x-7}$ and $g(x)=\frac{7x+4}{5x-3}$ then find f(g(x)) and g(f(x)). Also find f(3) and g(2) [7]

Q.3 (a) Evaluate: $\lim_{x \to 2}\left[\frac{1}{x^2-5x+6}+\frac{1}{2x^2-7x+6}\right]$ [7]

Q.3 (b) Discuss the continuity of the following functions at the point indicated: [7]

(i) $f(x) = 2x + 3 \quad 0 \le x < 1$
$= 3x + 2 \quad 1 \le x \le 2$
at $x = 1$.

(ii) $f(x) = 3x - 4 \quad 0 \le x \le 2$
$= 2x - 2 \quad 2 < x \le 3$
at $x = 2$.

OR

Q.3 (a) If f is continuous at x = 0, where [7]

$f(x) = 3x + a + b \quad x > 0$
$= x + 4 - b \quad x < 0$
$= 1 \quad x = 0$

then find a and b.

Q.3 (b) Evaluate: (i) $\lim_{x \to 0}\frac{10^x-2^x-5^x+1}{3x^2}$ and (ii) $\lim_{x \to 0}\left(\frac{2x-1}{1+4x}\right)^{1/2x}$ [7]

Q.4 (a) Find $\frac{dy}{dx}$ if $e^{2y}=x^2-3x+2$ [7]

Q.4 (b) Find the values of x for which the function $f(x) = x^3 - 9x^2 + 15x + 20$ is (i) increasing and (ii) decreasing. [7]

OR

Q.4 (a) The price of a commodity is p and the demand D and supply S are given by $D=\frac{12p}{p-1}$ and $S = p^2$. Find the equilibrium price. Also find the rate of change of demand and supply at equilibrium price. [7]

Q.4 (b) Find $\frac{d^2y}{dx^2}$ if $y = (x^2 + 3)a^x$. [7]

Q.5 (a) Using Cramer's rule, solve the system of equations: [7]

$x + y + z - 7 = 0, \quad x + 2y + 3z - 16 = 0, \quad x + 3y + 4z - 22 = 0$

Q.5 (b) Find A^{-1} if $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$ [7]

OR

Q.5 (a) Using Matrix method, solve the following system of equations: [7]

$5x - 3y - 11 = 0, \qquad 2x - y = 4$

Q.5 (b) Show that $\begin{vmatrix} a+b+2c & a & b \\ c & b+c+2a & b \\ c & a & c+a+2b \end{vmatrix} = 2(a+b+c)^3$ [7]
