



**NX-5394**

Seat No. \_\_\_\_\_

**First Year B. B. A. (Non CBCS) Examination**

**February – 2017**

**Business Mathematics**

Time : 3 Hours]

[Total Marks : 100

1 (a) Solve :  $\sqrt{\frac{x}{1-x}} + \sqrt{\frac{1-x}{x}} = \frac{13}{6}$  10

(b) If  $\alpha$  and  $\beta$  are roots of  $x^2 - 14x + 48 = 0$ , obtain 10

(i)  $\frac{1}{\alpha} + \frac{1}{\beta}$

(ii)  $\alpha^3 + \beta^3$

(iii)  $\alpha + \beta$

**OR**

1 (a) The sum of first 8 terms of an AP is 124 and the sum of its first 11 terms is 220. Find  $T_{25}$  and  $S_{25}$ . 10

(b) (i) Find sum of  $0.3 + 0.33 + 0.333 + \dots + n$  terms. 10

(ii) If  $3, a+3$  and  $4a$  are in G.P. Find  $a$ , also find common ratio.

2 (a) Explain Interpolation and Extrapolation. 10

(b) Find missing frequency : 10

$x:$	40	50	60	70	80	90	100
$y:$	18	21	26	–	32	–	40

**OR**

2 (a) (i)  ${}^{n-1}P_3 : {}^n P_4 = 1:9$  find  $n$ . 10

(ii) How many words can be formed by using all letters of the word RAJESH ? Out of them how many (i) begin with R (ii) begin with R and end with H.

(b) (i)  ${}^9c_4 + 2({}^9c_5) + {}^9c_6 = {}^{11}c_x$  find  $x$ . 10

(ii) In a college student group there are 5 girls and 4 boys. In how many ways principal can form a committee of 5 students in such a way that

(i) at the most 3 girls

(ii) at least 2 boys.

3 (a) Expand  $\left(2x + \frac{3}{y}\right)^4$ . 5

(b) Find value of  $(\sqrt{3} + \sqrt{2})^4 + (\sqrt{3} - \sqrt{2})^4$ . 5

(c) Prove that there is no constant term in  $\left(2x^2 + \frac{1}{x}\right)^{11}$ . 5

(d) Find middle term of  $\left(\frac{x}{3} - \frac{3}{x}\right)^5$ . 5

**OR**

3 (a) If  $A = \begin{bmatrix} 2 & 4 & 5 \\ 4 & -7 & 6 \end{bmatrix}$ ,  $B = \begin{bmatrix} 2 & 6 \\ 5 & 2 \\ -7 & 11 \end{bmatrix}$ ,  $C = \begin{bmatrix} 5 & 4 \\ 7 & -11 \\ -9 & 6 \end{bmatrix}$  10

verify that  $A(B+C) = AB + AC$

(b) (i) Write any two properties of determinants with an example. 10

(ii) Solve by Cramer's rule

$$3x + 7y + 4 = 0, \quad 4x + y - 3 = 0$$

4 Find  $\frac{dy}{dx}$  : (any four) 20

(1)  $y = (2x-1)(5x+3)$

(2)  $y = e^x \cdot \log x$

(3)  $y = \left(1 + \frac{1}{x+1}\right) \cdot \left(1 + \frac{1}{x+2}\right)$

(4)  $y = \log\left(\frac{x+1}{x-1}\right)$

(5)  $y = x^x$

**OR**

4 Integrate w.r.t.  $x$  : (any four) 20

(1)  $\int \left( \sqrt{x} \cdot \frac{x}{2} + \frac{2}{\sqrt{x}} \right) dx$

(2)  $\int x \cdot \log x \, dx$

(3)  $\int \frac{4x-1}{2x^2-x+3} \, dx$

(4)  $\int (2x+9)(x-3) \, dx$

(5)  $\int x e^{-x} \, dx$

5 (a) Explain Gauss Elimination method. 10

(b) Solve the following linear equation by Gauss – Jordan method :

$$x + y + z = 3$$

$$2x + y - z = 3$$

$$x - y + z = 9$$

**OR**

**5** (a) Find maximum value and minimum value of **10**

$$y = x^3 - 2x^2 - 4x - 1$$

(b) A speed function  $S = 3t^3 + 5t^2 - 6$ . Find **10**

(i) Velocity and Acceleration

(ii) Also find value of velocity and acceleration at  $t = 2$ .

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