

[This question paper contains 3 printed pages.]

437

Your Roll No.

B.A. (Hons.)/II

E

DISCIPLINE CENTRED CONCURRENT COURSE

(Maths for other than Economics)

(Algebra and Calculus)

(Admission of 2005 and onwards)

Time : 2 Hours

Maximum Marks : 38

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

*Question No. 1 is compulsory and carries
eight marks.*

*Attempt Six more questions from the remaining
Question Nos. 2 to 10, selecting two question each
from Section I, II and III.*

Each question carries five marks.

1. (a) Determine Whether the set $\{(1,1,1), (1,-1,1), (1,-1,1)\}$ in R^3 . is linearly independent. (2)

(b) If $y = (\log x)^x$, find $\frac{dy}{dx}$ (2)

- (c) Examine the continuity of the function

$$f(x) = \begin{cases} \frac{|x|}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases} \quad \text{at } x = 0 \quad (2)$$

(d) Evaluate $\int x^2 \sin x \, dx$ (2)

SECTION-I

2. Solve the following system of equations:

$$x + y + 3z = 1$$

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

$$5x + 7y + z = 7 \quad (5)$$

3. Find $x^2 + y^2 + z^2 - 2x + 4y + 6z + 1 = 0$ (5)

4. Find the co-ordinate of the focus, axis of parabola, the equation of the directrix and the length of the latus rectum of the parabola $y^2 = 12x$. Also sketch the parabola. (5).

Section-II

5. If $x^m y^n = (x + y)^{m+n}$, prove that $\frac{dy}{dx} = \frac{y}{x}$ (5)

6. Find the maximum and minimum value of the function
 $f(x) = x^3 - 12x^2 + 36x + 21$ (5)

7. Verify the Roll's theorem for the function
 $f(x) = x^4 - 3x^2 + 4$ in the interval $[-4, 4]$ (5)

Section-III

8. Find the area bounded by the circle $x^2 + y^2 = 4$ (5)

9. Solve the following differential equation

$$\frac{dy}{dx} = x\sqrt{x^2+1}; \text{ given that } y = 6 \text{ at } x = 0. \quad (5)$$

10. Evaluate $\int_1^e \frac{1}{x(1+\log x)^2} dx$ (5)