PR XII (02) 17

MATHEMATICS (New)

Inter Part-II

(Fresh/Reappear)

Note: Time allowed for Section – B and Section – C is 2 Hours and 40 minutes.

Section – B

Marks: 50

Q-II Answer any TEN parts. Each part carries FIVE marks.

1. Evaluate $\underset{x\to 0}{\text{Limit}} \frac{a^x - 1}{x}, \quad a > 0$

2. Use first principle rule to determine the derivative of $f(x) = \frac{5}{4x-3}$

3. Find $\frac{dy}{dx}$ when $y = \frac{1+\text{Tan } 2x}{\text{Cosec } 3x}$

4. Find an equation of the tangent line to the curve Sin(x – y) = xy at $(0, \pi)$

5. Evaluate the limit $\lim_{t\to 0}\left[\frac{te^t}{1-e^t}i + \frac{e^{t-1}}{\text{Cos } t}j\right]$

6. Use suitable substitution to evaluate $\int \frac{dx}{x^2+16}$

7. Evaluate $\int_{-1}^{7} \frac{x}{\sqrt{x+2}}\,dx$

8. Find the equation of the line that passes through the points A(3,1) and B(–1,3)

9. Find the equation of the circle which contains the points (2,6), (6,4) and has its centre on the line 3x + 2y – 1 =0

10. For what value of C the line x – y + c = 0 will touch the ellipse $\frac{x^2}{4} + \frac{y^2}{1} = 1$

11. Solve the differential equation $y\frac{dy}{dx} + xy^2 - x = 0$

12. If $U = f\left(\frac{y}{x}\right)$ then show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = 0$

13. Use Simpson's rule to approximate the value of the definite integral $\int_2^4 x^2 dx$, n = 3.

Section – C

Marks: 30

Note : Attempt any THREE questions. Each question carries equal marks.

Q-III (a) Find the composite function f(g(x)) and g[f(x)] for $f(x) = x^2 + 1$ and $g(x) = 1 - x^2$

(b) Find the critical values of the function $f(x) = 2x^3 - 3x^2 - 72x + 15$

Q-IV (a) Evaluate $\int \frac{3x+5}{x^2+2x-3}dx$

(b) Find the area of the triangular region whose vertices are A(-1, -2), B(2,5), C(5,2)

Q-V (a) Show that the angle in the semi circle of the circle $(x - h)^2 + y^2 = a^2$, h = 1, a = 2 is a right angle.

(b) Write the equation of the hyperbola with vertices at (2, -2), (-4, -2) and that passes through the point with coordinate (5,1)..

Q-VI (a) Transform to axes inclined at an angle 45° to the original axes of the conic $x^2 - y^2 = a^2$

(b) Find the centroid of the triangle ABC whose vertices are A(1,4), B(2,6), C(3,–1)