

Model Paper
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. Find the composite function $f[g(x)]$ and $g[f(x)]$ for the functions $f(x) = 2x^2 + 9$ and $g(x) = \sqrt{x+3}$
2. Evaluate $\lim_{x \rightarrow 1} \frac{x^2 + 2x - 3}{x - 1}$
3. Use first principle rule to determine the derivative of $f(x) = \frac{1}{\sqrt{2x+3}}$
4. Use any suitable rule to perform $\frac{dy}{dx}$ for the function $y = \frac{1 + \cot 2x}{\operatorname{Cosec} 3x}$
5. Find an equation of the tangent line to the curve $x^2 + y^2 = 13$ at $(2, -3)$
6. Find $F''(\theta)$ if $F(\theta) = \sin^2 \theta \mathbf{i} + \cos 2\theta \mathbf{j} + \theta^2 \mathbf{k}$
7. Evaluate the integral $\int x \tan^{-1} x \, dx$
8. Evaluate $\int_0^1 3x\sqrt{3x^2 + 2} \, dx$
9. Find the equation of the line that passes through the pair of points $A(3,4)$ and $B(-5, 5)$
10. Find the condition at which the line $ax + by + c = 0$ touches the circle $x^2 + y^2 + 2gx + 2fy + c = 0$
11. Find the points of intersection in between the line $2x - y + 1 = 0$ and the parabola $y^2 = 9x$
12. Solve the differential equation $\frac{dy}{dt} = \frac{y}{t} + \frac{t^2}{y^2}$
13. Verify Euler's theorem for the homogenous function $u = f(x,y) = ax^2 + 2hxy + by^2$

Section – C

Marks: 30

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

- Q-III (a) Find iterate x_3 of Newton – Raphson iterative method for the function $f(x) = x^3 - 1$, $x_0 = 1$
- (b) For what value of C the line $y = x + c$ will touch the hyperbola $\frac{x^2}{25} - \frac{y^2}{16} = 1$
- Q-IV (a) Find the equation of the circle, which contains the points $(0,0)$, $(0,3)$ and $(-4,0)$
- (b) Find the area of the triangular region whose vertices are $A(2,4)$, $B(-2, 2)$ & $C(0,0)$
- Q-V (a) Find the critical values of the function $f(x) = 2x^3 - 3x^2 - 60x + 5$
- (b) Find $\frac{d^2y}{dx^2}$ for the parametric functions $x(z)$, $y(z)$, when $x = 4z^2 + 1$, $y = 6z^3 + 1$
- Q-VI (a) Evaluate $\int \frac{dx}{x^2 - 1}$
- (b) Find $\frac{dy}{dx}$ when $x^2y^2 + 2y^3 = x^2 + 2$ implicitly.