

MATHEMATICS Part-II Swat 2025 Time: 20 Minutes Marks: 20 Multiple Choice Questions 01 Mark for each	Paper Code 	Roll No. of the Student
--	---	--

P-366

Serial No. Of the Answer Book _____

SECTION-A

Note:

- 1) Attempting all MCQs is compulsory. This paper along with the OMR sheet must be returned to the superintendent after due time
- 2) Fill the circle (A)(B)(C)(D), which one is correct with blue or black ball point in separate OMR Sheet like ●
- 3) If more than one circle in the OMR sheet is filled then no credit will be given to such answer.

- i. $x + \frac{x^3}{3!} + \frac{x^5}{5!} + \frac{x^7}{7!} + \dots$ is a _____ series.

(A) e^x
(B) $\sin x$
(C) $\cos x$
(D) $\tan x$
- ii. If $f(x) > 0$ in (915) then $f(x)$ is _____.

(A) Increasing
(B) Decreasing
(C) Constant
(D) Convergent
- iii. $\lim_{x \rightarrow x_0} (C \cdot \bar{F}(x)) =$ _____.

(A) $C \cdot \bar{F}(x)$
(B) $C \cdot \bar{F}(x_0)$
(C) $C + \bar{F}(x_0)$
(D) $Cx_0 \cdot \bar{F}(x)$
- iv. $\int_0^1 e^x dx =$ _____ + c.

(A) e
(B) $e - 1$
(C) e^x
(D) $e + 1$
- v. $\int_a^9 f(x) dx =$ _____.

(A) a
(B) 1
(C) 0
(D) $2f(a)$
- vi. Two lines having slopes m_1 and m_2 and both are parallel then

(A) $m_1 m_2 = 1$
(B) $m_1 = m_2$
(C) $m_1 = \frac{1}{m_2}$
(D) $m_1 + m_2 = 0$
- vii. $xx_1 + yy_1 = a^2$ in the equation of _____ to circle $x^2 + y^2 = a^2$.

(A) Normal
(B) Secant
(C) Tangent
(D) Slope
- viii. If $g^2 + f^2 - c = 0$, then the circle is _____.

(A) Real
(B) Imaginary
(C) Different from zero
(D) Point circle
- ix. In equation $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$, the center points are _____.

(A) (a, b)
(B) (x, y)
(C) (h, k)
(D) $(-h, -k)$
- x. The graph of parabola $y^2 = 4px$ if $p > 0$ is open towards _____.

(A) Right
(B) Left
(C) Up
(D) Down
- xi. If $f(x) = 3x - 8$, then $f'(2)$ is _____.

(A) -2
(B) $\frac{10}{3}$
(C) 6
(D) 2
- xii. $\frac{e^x + e^{-x}}{2} =$ _____.

(A) $\sinh x$
(B) $\sin x$
(C) $\cosh x$
(D) $\coth x$
- xiii. $\lim_{n \rightarrow \infty} \frac{5n^7 + n^3}{5n^6 + n^7} =$ _____.

(A) ∞
(B) 0
(C) 1
(D) 5
- xiv. The slope of second line is called _____ rate of change.

(A) Average
(B) Approximate
(C) Exact
(D) Both A & B
- xv. If $f(x) = 4x^3$ then $f'(x) =$ _____.

(A) $12x$
(B) $12x^2$
(C) $12x^3$
(D) 12
- xvi. If $f(x) = \ln(ax + 4)$, then $f'(x) =$ _____.

(A) $\frac{a}{b + ax}$
(B) $\frac{-a}{(ax + b)^2}$
(C) $\frac{-a^2}{(ax + b)^2}$
(D) $\frac{a^2}{(ax + b)^2}$
- xvii. $\int \frac{1}{\sin^2 x} dx =$ _____ + c.

(A) $\csc^2 x$
(B) $\tan x$
(C) $\cot x$
(D) $-\cot x$
- xviii. If $y = mx + c$ touches the parabola $y^2 = 4px$, then $c =$ _____.

(A) $\frac{m}{p}$
(B) $\frac{p}{m}$
(C) mp
(D) pm^2
- xix. An ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, can be reduces to a circle if _____.

(A) $c = ae$
(B) $c = a$
(C) $a = b$
(D) a and $b = 0$
- xx. Degree of $\left(\frac{d^3 y}{dx^3}\right)^2 - \left(\frac{d^2 y}{dx^2}\right)^3 + x^2 \frac{dy}{dx} + y = 0$ is _____.

(A) 0
(B) 1
(C) 2
(D) 3

MATHEMATICS Part-II

Swat 2025

Note: Time allowed for section B and C is 2 hours and 40 minutes.

SECTION "B"

Marks: 50

II. Attempt any Ten Parts out of the following. Each Part carries equal marks.

- i. Differentiate $f(t) = \frac{4t+1}{6t+t^2}$.
- ii. Evaluate the $\lim_{x \rightarrow 1} \frac{\frac{1}{x} - 1}{x-1}$.
- iii. Reduce the equation $7x+10y-13=0$ into normal form.
- iv. Find $f'(x)$ when $f(x) = \frac{x^3 + \tan x}{3x + 2 \tan x}$.
- v. Find the velocity, speed and acceleration at time $t=2$, where $\vec{r}(-1) = \cos t \hat{i} + \sin t \hat{j} + t^3 \hat{k}$.
- vi. Evaluate $\int \frac{x+3x^2}{\sqrt{x}} dx$.
- vii. Evaluate $\int_{\pi/2}^{\pi} \cos\left(\frac{x}{2} + \pi\right) dx$.
- viii. Find the perpendicular distance of $p(3, -1)$ to the line $5x+12y=16$.
- ix. For what value of n , the line $2x+2y+n=0$, touches the circle $x^2+y^2=64$.
- x. Under what condition the line $4x-y=4$ intersects the parabola $x^2=y$.
- xi. Find the vertices, foci, endpoints of the axes of $\frac{x^2}{4} + \frac{y^2}{9} = 1$.
- xii. Solve the D equation $\frac{dy}{dx} = \frac{x-y}{x+y}$.
- xiii. Verify Euler's Theorem if $f(x,y) = (x^2+xy+y^2)^{-1}$.

SECTION "C"

Marks: 30

Note: Attempt any Three questions of the following. Each question carries equal Marks.

- III. a) Use bisection method to solve $f(x) = e^x - 2 - x$ in $[1, 2]$.
- b) Find the vertices, foci and eccentricity of hyperbola $\frac{x^2}{9} - \frac{y^2}{16} = 1$.
- IV. a) Prove that $x = 8$ and $y = 7$ touch the circle $x^2 + y^2 - 6x - 4y - 12 = 0$.
- b) Find the points of concurrency of $x+4y+3=0$ and $2x+2y+1=0$ and $5x-4y-5=0$.
- V. a) Evaluate $\int \frac{dx}{x^2-1}$ by partial fraction.
- b) Find the interval where $f(x) = x^3 + 3x^2 + 1$ is increasing and where decreasing.
- VI. a) Find $\frac{dy}{dx}$ when $y = 6t^4 + 9$, $x = 3at^2$.
- b) Evaluate $\int \frac{dx}{\sqrt{x^2+a^2}}$.