

MATHEMATICS Part-II HSSC-12th-Swat-2026 Time: 20 Minutes Marks: 20 Multiple Choice Questions 01 Mark for each		Paper Code ① ● ②	Roll No. of the Student _____ Serial No. Of the Answer Book _____
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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.i. The correct equation for a horizontal line passes through the point (0,-3) is:
 ● $y = -3$ (B) $y = 0$ (C) $x = -3$ (D) $x = 0$
- ii. For the line $y = -x + 10$, the point (5,5) lies:
 (A) Above the line (B) Below the line ● On the line (D) It is the y-intercept
- iii. The center of the circle having equation $x^2 + y^2 = 25$ is:
 (A) (5,5) (B) (0,5) (C) (5,0) ● (0,0)
- iv. The line representing the Directrix of the parabola $x^2 = 8y$ is:
 (A) $y = 2$ ● $y = -2$ (C) $x = 2$ (D) $x = -2$
- v. The coordinates of the foci for the ellipse $x^2 + 4y^2 = 16$ are:
 ● $(\pm 2\sqrt{3}, 0)$ (B) $(0, \pm 2\sqrt{3})$ (C) $(\pm 4, 0)$ (D) $(\pm 2, 0)$
- vi. The order of the differential equation $\sqrt{\frac{d^4y}{dx^4}} + 3x(\frac{d^3y}{dx^3})^{\frac{1}{2}} = e^x$ is:
 (A) 3 (B) 4 ● 5 (D) $\frac{1}{5}$
- vii. The ODE $x^3 \frac{d^3y}{dx^3} + x(\frac{dy}{dx})^2 + 6y = 1$ is:
 (A) Linear, third Order ● Non-linear, third Order (C) Linear, Second Order (D) Non-linear, Second Order
- viii. If $f(x, y) = (x^2 + y^2)^3$, then f_x should be:
 (A) $6y(x^2 + y^2)^2$ ● $6x(x^2 + y^2)^2$ (C) $6(x^2 + y^2)^2$ (D) $3x(x^2 + y^2)^2$
- ix. For $f(x) = e^x - 3$, on the interval [1,2], the updated interval after the first iteration of the Bisection Method is:
 ● [1, 1.5] (B) [0.5, 1.5] (C) [1.25, 2] (D) [1.5, 2]
- x. If $f(x) = x^2 - 2$, the iterative formula to find the square root of 2 is:
 ● $x_{n+1} = \frac{1}{2}(x_n + \frac{2}{x_n})$ (B) $x_{n+1} = x_n - (x_n^2 - 2)$ (C) $x_{n+1} = \frac{(x_n^2 + 2)}{x_n}$ (D) $x_{n+1} = 2x_n - \frac{2}{x_n}$
- xi. The statement " $x \rightarrow a^-$ " best describes:
 ● x is less than a (B) x is a negative number (C) x is a constant value very close to $-a$ (D) x is decreasing toward negative infinity
- xii. The correct value of the limit, $\lim_{x \rightarrow 25} \frac{\sqrt{x} - 5}{x - 25}$ is:
 (A) $\frac{1}{5}$ ● $\frac{1}{10}$ (C) $\frac{1}{25}$ (D) Does not exist
- xiii. The average rate of change of the linear function $f(x) = x^2 - 2x$ as x increases from 0 to 3 is:
 (A) 0 ● 1 (C) 2 (D) 3
- xiv. Derivative of $y = \sec x$ is:
 ● $\tan x \sec x$ (B) $\cos x \sec x$ (C) $\cot x \sec x$ (D) $\operatorname{cosec} x \sec x$
- xv. The 2nd derivative of $f(x) = 4x^3$
 (A) $12x^2$ (B) $12x^3$ (C) $24x^2$ ● $24x$
- xvi. If $f(t) = \frac{t}{t^2-9}i + \cos t j + \sqrt{t+5}k$, is a vector function, the positive value of t excluded from the domain is:
 (A) 9 ● 3 (C) 5 (D) 0
- xvii. The most general anti-derivative of $f(x) = \tan x$ is:
 ● $\ln |\frac{1}{\cos x}| + C$ (B) $\ln |\cos x| + C$ (C) $\sec^2 x + C$ (D) $\cot^2 x + C$
- xviii. If $f(x)$ is an ant-derivative of $f(x) = 2x + 3$, and $F(2) = 10$, the specific equation for $F(x)$ is:
 ● $F(x) = x^2 + 3x$ (B) $F(x) = x^2 + 3x + 10$ (C) $F(x) = x^2 + 3x + 5$ (D) $F(x) = x^2 + 2x + 3$
- xix. The correct value of $\int (k^2 + a)dx$ is:
 (A) $(2k + a)x + C$ (B) $(2k^2 + a) + C$ ● $(k^2 + a)x + C$ (D) $k^2 + C$
- xx. To Evaluate the integral $\int \frac{x}{\sqrt{x^2+9}} dx$, the correct solution is:
 (A) x (B) $x^2 + 9$ ● $\sqrt{x^2 + 9}$ (D) $\frac{1}{\sqrt{x^2 + 9}}$

MATHEMATICS Part-II

HSSC-12th-Swat-2026

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. Evaluate the limit of: $\lim_{x \rightarrow -1} \frac{x^2 - 1}{x^2 + 3x + 2}$
- ii. Find derivative of the implicit function $x^2 \sin(y) + y = x$
- iii. Find equation of the tangent line to the curve $y = \frac{e^x}{x}$ at $x = 1$
- iv. Find the vector derivative of $F(x) = (x^3 - x)i + \sec xj - \ln 5xk$
- v. Evaluate the integral and check the result through differentiation $\int \frac{(x+1)^2}{x^3} dx$
- vi. Evaluate the integral $\int x \cos x dx$
- vii. Find the angle from the line $3x - 4y + 12 = 0$ to the line $4x + 3y - 8 = 0$
- viii. Find equation of a line if the x - intercept and y - intercept of the line are $x: (6,0)$ and $y: (0,2)$
- ix. Find the center and radius of the circle $x^2 + y^2 - 2x - 4y + 1 = 0$
- x. Find equation of Tangent and Normal at a point $(-2, \sqrt{2})$ to the ellipse $\frac{x^2}{12} + \frac{y^2}{3} = 1$
- xi. Translate to parallel axes through the point $(1, -2)$ the conic $25x^2 + 4y^2 - 50x + 16y - 59 = 0$
- xii. Find the general solution of the non-linear differential equation $\frac{dy}{dx} = \cos(x + y + 1)$
- xiii. Perform two iteration of Bisection Method to approximate the actual root r of the function $f(x) = x^3 - 9 - 4x$ in the interval $[2, 3]$

SECTION "C"

Marks: 30

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

- III. a) Determine the $\lim_{x \rightarrow \infty} \frac{10x^4 + x^2}{5x^4 - 3x + 2}$
- b) Find derivative of $y = \cos^{-1}(\ln x)$
- IV. a) Find the area between the x - axis and the curve $f(x) = x^2 - x - 6$ from $x = 0$ to $x = 4$
- b) Find the point of intersection $P(x, y)$ of the pair of lines $5x + 2y = 1$ & $3x + 4y = -5$
- V. a) Prove that the line $4x + 3y - 25 = 0$ touch the circle $x^2 + y^2 - 6x - 8y = 0$. Find also the contact point.
- b) Find vertices, foci, eccentricity and the asymptotes of the hyperbola $25x^2 - 144y^2 = 3600$
- VI. a) Use Euler's Theorem to verify the function $f(x, y) = x^3 \ln \frac{y}{x}$ is a homogenous function of degree 3.
- b) Find iterate x_3 of Newton Raphson Method for the function $f(x) = e^x - 3x$ with $x_0 = 0$