Mathematics Paper – XII (01) (18)

Name

Roll No

Time Allowed: 20 Minutes

SECTION – A

Marks : 20

1۔ ہر سوال کے سامنے چار دائرے دیے گئے ہیں، صرف صحیح جواب والا دائرہ بھر دیں۔

2۔ دائروں کو شیڈ (بھرنے) کے لئے نیلے یا کالے رنگ کا بال پوائنٹ استعمال کریں۔

3۔ جواب میں ایک سے زائد دائرے بھرنے سے جواب غلط تصور ہوگا۔

1	If $\text{Tan}\,\theta = \frac{m_1 - m_2}{1 + m_1 m_2}$ and if $\frac{m_1 - m_2}{1 + m_1 m_2}$ is negative then the angle is	○ Acute	● Obtuse	○ Right	○ Zero
2	The 2nd degree homogeneous equation $ax^2 + 2hxy + by^2 = 0$ represents two straight lines; the lines are real and coincident. If.....	○ $h^2 - ab < 0$	○ $h^2 - ab \leq 0$	● $h^2 - ab = 0$	○ $h^2 - ab > 0$
3	The tangent equation to the circle $x^2 + y^2 = a^2$ at a point $A(x_1, y_1)$ is.....	○ $xy_1 + x_1y = a^2$	● $xx_1 + yy_1 = a^2$	○ $xx_1 - yy_1 = a^2$	○ $xy_1 - x_1y = a^2$
4	The product of the slopes of tangent and normal lines is equal to.....	○ 0	○ $\frac{\pi}{2}$	○ 1	● –1
5	The line $y = mx + c$ should touch the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ then.....	○ $c = \pm\sqrt{m^2 + a^2b^2}$	○ $c = \pm\sqrt{a^2m^2 - b^2}$	● $c = \pm\sqrt{a^2m^2 + b^2}$	○ $c = \pm\sqrt{b^2 - a^2m^2}$
6	The slope of tangent line at a point (x1, y1) to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is m = ...	○ $\frac{a^2}{b^2}\frac{y_1}{x_1}$	● $\frac{-b^2}{a^2}\frac{x_1}{y_1}$	○ $\frac{b^2}{a^2}\frac{x_1}{y_1}$	○ $\frac{-a^2}{b^2}\frac{y_1}{x_1}$
7	The degree of differential equation $\frac{d^3y}{dx^3} - \left(\frac{d^2y}{dx}\right)^4 + 2\left(\frac{dy}{dx}\right)^3 + 9y = 3$ is	● 1	○ 2	○ 3	○ 4
8	$\frac{x}{a} + \frac{y}{b} = 1$ is a formula of	○ Slope intercept form	○ Point–slope form	○ Two point form	● Double intercept form
9	A function that defined by more than one equation is called.....function.	○ Linear	● Compound	○ Quadratic	○ Composite
10	The equation $x \cos\theta + y \sin\theta = P$ of a line is.....form.	○ Symmetric form	○ Trigonometric	○ Tangent	● Normal
11	If $\lvert x\rvert = x$ then	● $x > 0$	○ $x \geq 0$	○ $x < 0$	○ $x \leq 0$
12	The equation $y2 = x$ is .....function.	○ Onto	○ One – one	○ Many – to one	● Not
13	The function $f(x) = \frac{\text{Sin}\,x}{x}$ is.....function.	○ An odd	● An even	○ Neither even nor odd	○ Both even and odd
14	The function $f(x) = \sqrt{x-2}$ is continuous for all x and	○ $x < 2$	○ $x \leq 2$	○ $x > 2$	● $x \geq 2$
15	$\frac{d}{dx}(2^x)$=.....	● $2^x \log e^2$	○ $x2^{x-1}$	○ 2^x	○ $2^x \log_2 e$
16	$\frac{d}{dx}(\text{Cot}\,h^{-1}x)$ = ...	○ $\frac{1}{x^2-1}$	● $\frac{-1}{x^2-1}$	○ $\frac{1}{\sqrt{1+x^2}}$	○ $\frac{1}{\sqrt{x^2-1}}$
17	f(x) is strictly increasing on (a,b) if $f'(x) > 0$ for.....	○ $a \leq x \leq b$	○ $a \leq x < b$	○ $a < x \leq b$	● $a < x < b$
18	$\int \text{Cosec}^2 x\,dx$ = ...	○ Cotx + c	○ – Tan x + c	● – Cot x + c	○ Sec x + c
19	For $\int\sqrt{x^2 - a^2}\,dx$ we substitute.....	○ x = a Sin θ	○ x = a Tan θ	● x = a Sec θ	○ x = a Cosec θ
20	$\int_0^{\frac{\pi}{2}} \text{Cos}\,x\,dx$ = ...	○ 0	● 1	○ $\frac{\pi}{2}$	○ –1

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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 $\lim_{x\to 0} \frac{a^x - 1}{x}, \quad a > 0$

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 $\text{Sin}(x - y) = xy$ 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)