F-552

KT-XII-18-I

Sig. of Supdt.....

Mathematics (Part – II)

Fresh/Reappear

Roll No.....

Fic. No.....

Fic. No.....

Time allowed: 3 Hrs code : 22 **Mathematics (Part – II)** **Marks: 100**

Fresh / Reappear

Note: There are three sections of the paper, A, B & C. Attempt Section – A on the same paper and return it to the Superintendent within the given time. No marks will be awarded for cutting, erasing or over writing. Mobile phone etc. are not allowed in the examination hall.

Time: 20 Mins **Section "A"** **Marks: 20**

Q.1 Write the correct option i.e. A, B, C or D in the empty box provided opposite each part.

i. Line of the form y = mx + c is called .....form of line. [A]
A. Slope intercept B. Point slope C. Two point D. Double– intercept

ii. The homogenous form of the non-homogenous line ax + by + c = 0, c ≠ 0, a,b and c are constant is ..... [A]
A. ax + by = 0 B. ax + c = 0 C. by + c = 0 D. Both B & C

iii. Center of the circle $x^2 + y^2 = r^2$ is ..... [C]
A. (1, 1) B. (2,0) C. (0, 0) D. (0, 1)

iv. The angle inscribed in a semi-circle is ..... [D]
A. 30° B. 45° C. 60° D. 90°

v. A tangent to a circle passes through .....of the circle. [A]
A. One point B. Two points C. Center D. No point on the circle

vi. If the eccentricity e = 1 the conic is called ..... [B]
A. Ellipse B. Parabola C. Circle D. Hyperbola

vii. The portion of the x-axis bounded by the ellipse is called ..... [C]
A. Major axis B. Minor axis C. Semi major D. Semi minor

viii. $\frac{(x-3)^2}{16}+\frac{(y)^2}{4}=1$ then (3, 0) is the .....of equation. [B]
A. Vertex B. Focus C. Centre D. None of these

ix. $\frac{x^2}{25}-\frac{y^2}{4}=1$ is an equation of ..... [D]
A. Parabola B. Ellipse C. Circle D. Hyperbola

x. If f(x, y) = $x^3 + y^2$ then fx at point (1, 2) is ..... [A]
A. 3 B. 4 C. 5 D. 6

xi. The relation $y = x^2$ is ..... [A]
A. Onto function B. One to one function C. Not a function D. One to many function

xii. Base of natural logarithm is ..... [C]
A. 10 B. 2 C. e D. Any real number

xiii. $\lim_{x\to\infty}\left(\frac{2x^3+1}{x^3}\right)=$ ..... [B]
A. 1 B. 2 C. ∞ D. 0

xiv. If y = 6a, then $\frac{dy}{dx}$ =.....,where is a constant [C]
A.6x B. 6a C.0 D. 6

xv. $\frac{d\left(e^{2x}\right)}{dx}=$..... [C]
A. $2e^x$ B. $2xe^{2x}$ C. $2e^{2x}$ D. e^{2x}

xvi. If f(x) is differentiable on (a, b) then the function f(x) is strictly increasing on (a, b) if .....for a< x <b. [A]
A. f'(x)>0 B. f'(x)<0 C. f'(x)=0 D. f'(x)≤0

xvii. If F(t) = ti – j and G(t) = i + tj than (F.G)(t) = ... [A]
A. 0 B. 1 C. 2 D. 1

xviii. $\int\frac{1}{1+x^2}dx=$..... [C]
A. $\sin^{-1}x + c$ B. $\cos^{-1}x + c$ C. $\tan^{-1}x + c$ D. $\sec^{-1}x + c$

xix. $\int_2^3 4dx=$..... [B]
A. 3 B. 4 C. 5 D. 6

xx. Lines parallel to x-axis having slope equal to ..... [B]
A. 1 C. ∞ D. None of these

Time: 2:40 Hours

KT-XII-18-I

P-353

Mathematics (Part – II)

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Section "B"

Marks: 50

Q.2 Attempt any TEN parts. Each part carries equal marks.

i. Determine $\lim_{x\to 1}\left(\frac{x^2+3x+2}{x^2+x+2}\right)^2$

ii. Let $y=\frac{\ln 5x}{x^8}$, find $\frac{dy}{dx}$

iii. Find the critical values of the function $y = 2x^3 - 3x^2 - 72x + 15$

iv. Evaluate the integral of $\int e^{(3x+2)}dx$

v. Evaluate $\int \frac{\cos^2 x}{\cos ecx}$

vi. Valuate $\int_{-6}^{0}\left(\sqrt{4-2x}\right)dx$

vii. Find the area of a triangular region A, B and C whose vertices are A(4, -5), B(5,-6) and C(3, 1).

viii. Find the center C(-g, -f) and radius $r=\sqrt{g^2+f^2-c}$ of the circle $x^2 + y^2 - 8x - 4y + 16 = 0$.

ix. Find what value of c the line $x - y + c = 0$ will touch the parabola $y^2 = 9x$.

x. Find the equations of tangent and normal to the ellipse $\frac{x^2}{7}+\frac{y^2}{4}=1$ at a point (3, 6).

xi. Solve the initial value problem $\frac{dy}{dx}=\cos x, y(0)=1$

xii. Find equation of a line parallel to $2y-4x=7$ and having y-intercept is 3

xiii Use trapezoidal rule to approximate $I=\int_1^3 \frac{1}{x}dx, n=6$. Round the answer to the nearest to hundredth place and compare your answer with exact value of the definite integral.

Section "C"

Marks: 30

Note: Answer any THREE questions. All questions carries equal marks.

Q.3 a. Evaluate $\lim_{x\to 0}\frac{\tan x}{x}$.

b. Let $(a-b)u^3 - (a+b)v^2 = c$ where a, b, c are constants. Find $\frac{du}{dv}$.

Q.4 a. Find the first three derivatives of the function $f(x) = \ln(\sin x)$

b. Evaluate $\int_1^2 (2x^{-2}-3)dx$.

Q.5 a. Find the area of the triangular region XYZ whose vertices are X(4, -5), Y(5, -6) and Z(3, 1).

b. Find equation of tangents to the circle $x^2 + y^2 = 2$ which make an angle of 45° with the x-axis.

Q.6 a. Write the equation of an ellipse having center is at (-3, 2), a = 2, b = 1, major axis is horizontal.

b. Show that the function $f(x, y) = (x^2 + 3y^2)^{1/3}$ is a homogenous function of degree 2/3.