Gujranwala Board Group-I *(First Annual Examination 2025)*

Roll No. Candidate: _____

MATHEMATICS	(Intermediate Part-II, Class (12^{th}) (1^{st} A 425 - II)	Paper II	(Group I)
Time : 30 Minutes	(Objective) - Code: 8193	Marks: 20	

NOTE: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circle, Cutting or filling two or more circles will result in zero mark in that question.

Q1.

S. #	Questions	A	B	C	D
1	$[\underline{k}\ \underline{i}\ \underline{j}] =$	1	–1	0	3
2	If $\underline{u} = \underline{i} + \underline{j}$, then $\lvert\underline{u}\rvert$ is	2	$\sqrt{2}$	$\frac{1}{\sqrt{2}}$	–2
3	The equation of latus rectum of parabola $y^2 = 4ax$ is	$y = a$	$y = -a$	$x = a$	$x = -a$
4	Associated equation of $x + 2y \leq 6$ is	$x + 2y = 6$	$x + 2y + 6 =$	$x - 2y - 6 = 0$	$x - 2y = 6$
5	The inclination of line parallel to y-axis is	0°	90°	45°	60°
6	Order of differential equation $\frac{x d^2y}{dx^2} + \frac{dy}{dx} - 2x = 0$	1	2	3	4
7	$\int \frac{a}{x} dx$ equals	ax	$a\ell nx + c$	$\frac{a}{x} + c$	$\ell nx + c$
8	The function $f(x) = ax^2 + bx + c$ has minimum value if	$a < 0$	$a = 0$	$a = -1$	$a > 0$
9	$\frac{d}{dx}(x^o)$ equals	0	1	–	2
10	$x = a\cos t$ and $y = a\sin t$ are parametric equations of	Circle	Parabola	Allipse	Hyperbola
11	The direction cosines of x-axis are	(1, 0, 1)	(1, 1, 0)	(0, 0, 1)	(1, 0, 0)
12	The equation $x^2 = y^2 + 1$ represents	Circle	Ellipse	Parabola	Hyperbola
13	The radius of circle $x^2+y^2-4x-6y=0$ is	$\sqrt{11}$	$\sqrt{13}$	$\sqrt{5}$	13
14	Distance between the points (1, 2) and (2, 1) is	$\sqrt{3}$	$\sqrt{5}$	$\sqrt{2}$	$\sqrt{7}$
15	$\int_a^b f(x)dx$ equals	$\int_a^b f'(x)dx$	$\int_b^a f(x)dx$	$-\int_b^a f(x)dx$	$-\int_a^b f(x)dx$
16	The right bisectors of atriangle are	Parallel	Perpendicular	Concurrent	Collinear
17	$\cos hx + \sin hx$ equals	e^x	e^{-x}	e^{2x}	$2e^x$
18	$\lim_{x \to a} \frac{f(x) - f(a)}{x - a}$	$f'(x)$	$f'(0)$	$f'(a)$	$f(x)$
19	If $y = 5e^x$, then y_3 equals	e^x	$5e^x$	25	$125e^x$
20	Differential of $\sqrt{y}$	$\sqrt{y}\,dx$	$\sqrt{y}\,dy$	$\frac{1}{2\sqrt{y}}dy$	$\frac{1}{2\sqrt{y}}dx$

MATHEMATICS (Intermediate Part-II, Class 12th) 1st A425 (Paper II) (Group I)

Time : 2:30 Hours (Subjective) **Marks: 80**

Note: Section I is compulsory. Attempt any THREE (3) questions from Section II.

SECTION - I

Q2. Write short answers to any EIGHT questions: **(8×2=16)**

(i) Define parametric function and give an example.

(ii) Given $f(x) = x^3 - ax^2 + bx + 1$. If $f(2) = -3$ and $f(-1) = 0$. Find the values of 'a' and 'b' (iii) Show that the parametric equations $x = a\cos\theta$, $y = b\sin\theta$ represent the equation of ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (iv) The real valued function 'f' and 'g' are defined below. Find fog(x) and gof(x): $f(x) = \frac{1}{\sqrt{x-1}}, x \neq 1$, $g(x) = (x^2 + 1)^2$

(v) Evaluate: $\lim_{x\to-\infty} \frac{4x^4 - 5x^3}{3x^5 + 2x^2 + 1}$ (vi) Find the derivative of the function by definition method: $f(x) = c$

(vii) Find the derivative of $y = \left(2\sqrt{x} + 2\right)\left(x - \sqrt{x}\right)$ with respect to x. (viii) Differentiate w.r.t 'x': $x^{-3} + 2x^{\frac{3}{2}} + 3$

(ix) If $y = x^4 + 2x^2 + 2$, prove that $\frac{dy}{dx} = 4x\sqrt{y-1}$ (x) Find $\frac{dy}{dx}$ if $y = x\cos y$ (xi) Find $\frac{dy}{dx}$ if $y = \sinh^{-1}(ax + b)$

(xii) Find $f'(x)$ if $f(x) = x^3 e^{1/x}$ $(x \neq 0)$

Q3. Write short answers to any EIGHT questions: **(8×2=16)**

(i) Evaluate: $\int x\left(\sqrt{x} + 1\right)dx$, $x > 0$ (ii) Integrate: $\int \frac{x^2}{4 + x^2}dx$ (iii) Find the integral $\int x\ell n\, x\, dx$

(iv) Evaluate: $\int e^x\left(\frac{1}{x} + \ell n\, x\right)dx$ (v) Evaluate: $\int_{-1}^{1}\left(x^{\frac{1}{3}} + 1\right)dx$ (vi) Find $\int \frac{\sin\theta}{1 + \cos^2\theta}d\theta$ (vii) Find the distance between the x - axis the curve $y = \sin 2x$ fom $x = 0$ to $x = \frac{\pi}{2}$ (viii) Find the distance between the points a (–8, 3) and B (2, –1) (ix) Find the midpoint of the line joining points A (3, 1) and (–2, –4) (x) Find the slope and inclination of line joining (3, –2) and (2, 1) (xi) Write an equation of the line through A (–6, 5) having slope 7. (xii) Check whether two lines are perpendicular $3y = 2x + 5$, $3x + 2y - 8 = 0$

Q4. Write short answers to any NINE questions: **(9×2=18)**

(i) Define optimal solution of the system of linear inequalities. (ii) Graph the solution set of inequality $5x - 4y \leq 20$. (iii) Write down an equation of tangent to the circle $x^2 + y^2 = 25$ at (4, 3). (iv) Find the centre and radius of circle whose equation is $x^2 + y^2 - 6x + 4y + 13 = 0$ (v) Find centre and foci of the ellipse whose equation is $25x^2 + 9y^2 = 225$ (vi) Find equation of hyperbola with centre (0,0) focus (6,0) and vertex (4,0). (vii) Write the general form of an equation of a circle. (viii) If 'O' is the origin and $\overline{OP} = \overline{AB}$, find point 'P' where A(–3, 7) and B (1,0). (ix) Find α so that $|a\underline{i} + (a+1)\underline{j} + 2\underline{k}| = 3$. (x) Find a real number 'a' so that $\underline{u} = 2\alpha\underline{i} + \underline{j} - \underline{k}$ and $\underline{v} = \underline{i} + a\underline{j} + 4\underline{k}$ are perpendicular. (xi) Prove that vectors $\underline{i} - 2\underline{j} + 3\underline{k}$, $-2\underline{i} + 3\underline{j} - 4\underline{k}$ and $\underline{i} - 3\underline{j} + 5\underline{k}$ are coplanar. (xii) Define direction cosines and direction angles of a vector. (xiii) Find a vector of length 5 in the direction opposite that of $\underline{v} = \underline{i} - 2\underline{j} + 3\underline{k}$.

SECTION - II

Note: Attempt any THREE questions.

Q5. (a) Find the values 'm' and 'n' so that function 'f' is continuous at $x = 3$ $f(x) = \begin{cases} mx & \text{if } x < 3 \\ n & \text{if } x = 3 \\ -2x + 9 & \text{if } x > 3 \end{cases}$ 5

(b) Show that $\frac{dy}{dx} = \frac{y}{x}$ if $\frac{y}{x} = \tan^{-1}\frac{x}{y}$ 5

Q6. (a) If $x = \sin\theta$ and $y = \sin m\theta$, show that $(1-x^2)y_2 - xy_1 + m^2y = 0$ 5

(b) Use differentials to approximate the value of $\sqrt{17}$. 5

Q7. (a) Graph the solution region by shading. Also, find all corner points for the system of inequalities: 5

$3x + 7y \leq 21$

$2x - y \leq -3$

$y \geq 0$

(b) Evaluate the integral: $\int_0^{\pi/6} x\cos x\, dx$ 5

Q8. (a) Find the equation of tengent to circle $x^2 + y^2 = 2$ parallel to the $x - 2y + 1 = 0$ 5

(b) Check whether the lines $4x - 3y - 8 = 0$, $3x - 4y - 6 = 0$, $x - y - 2 = 0$ are concurrent. If so, find the point where they meet. 5

Q9. (a) Find the centre, foci, eccentricity and vertices fo the hyperbola: $\frac{(y+2)^2}{9} - \frac{(x-2)^2}{16} = 1$ 5

(b) Find the volume of the tetrehedron whose vertices are A (2,1,8), B (2,3,9), C (2,1,4) and D (3,3,0) 5

Note: For Answers of long questions please study "Hamdard Notes Mathematics" Class 12.