Mathematics	(A)	L.K.No. 1468	Paper Code No. 8191
Paper II	(Objective Type)	Inter (Ist – A – Exam 2024)	
Time :	30 Minutes	Inter (Part - II)	Session (2020 – 22) to (2022 – 24)
Marks :	20		BWP-24

Note : Four choices A , B , C ,D to each question are given. Which choice is correct fill that circle in front of that Question No. on the Objective Bubble Sheet. Use Marker or Pen to fill the circles. Cutting or filling two or more circles will result in Zero Mark in that Question.

Q.No	
1 (1)	A function of the form f (x , y) = 0 is called : (A) Parametric Function (B) Identity Function (C) Explicit Function (D) Implicit Function
(2)	$\frac{e^{2x}-1}{2e^x}$ = : (A) Sinx (B) Cos x (C) Sinhx (D) Coshx
(3)	$\lim_{x \to a} \frac{f(x)-f(a)}{x-a}$ is equal to : (A) f ′(x) (B) f ′(0) (C) f ′(a) (D) f ′(2)
(4)	$\frac{d}{dx}\left(\frac{1}{ax+b}\right)$ is equal to : (A) $\frac{1}{(ax+b)^2}$ (B) $\frac{-a}{(ax+b)^2}$ (C) $\frac{a}{(ax+b)^2}$ (D) ln (ax + b)
(5)	Derivative of $Sin^2 x$ with respect to $Cos^2 x$ is : (A) −1 (B) 1 (C) tanx (D) cotx
(6)	Derivative of $Sinh^{-1} x$ with respect to x is : (A) $\frac{1}{\sqrt{1-x^2}}$ (B) $\frac{1}{\sqrt{1+x^2}}$ (C) $\frac{-1}{\sqrt{1-x^2}}$ (D) $\frac{-1}{\sqrt{1+x^2}}$
(7)	For $n \neq -1$, $\int x^n dx$ = : (A) $\frac{x^{n-1}}{n-1}+C$ (B) $x^{n+1}+C$ (C) $\frac{x^{n+1}}{n+1}+C$ (D) $\frac{x^n}{n+1}+C$
(8)	$\int Sec^2 nx dx$ = : (A) $\frac{n}{3}$ sec nx + c (B) n tan nx + c (C) tan nx + c (D) $\frac{1}{n}$ tan nx + c
(9)	When expression $\sqrt{x^2 - a^2}$ involve in integration , we substitute : (A) x = asecθ (B) x = asinθ (C) x = atanθ (D) x = sinθ
(10)	$\int_{-\infty}^{\infty} \frac{1}{1+x^2} dx$ = : (A) $\frac{\pi}{2}$ (B) π (C) $\frac{\pi}{4}$ (D) $\frac{\pi}{3}$
(11)	If Distance of point (5 , x) from x – axis is 3 then x = : (A) 7 (B) 5 (C) 3 (D) – 5
(12)	If ‘α’ is inclination of line ‘ℓ’ then it must be true that : (A) $0 \leq \alpha < \frac{\pi}{2}$ (B) $\frac{\pi}{2} \leq \alpha < \pi$ (C) $0 \leq \alpha \leq 2\pi$ (D) $0 < \alpha < \pi$
(13)	If lines are parallel then point of intersections are : (A) Does not exist (B) Finite (C) Infinite (D) Both B and C
(14)	A Feasible Solution which maximize or minimize the objective function is called : (A) Solution (B) Optimal Solution (C) Minimum Solution (D) Maximum Solution
(15)	Axis of Parabola $x^2 = 4ay$ is : (A) y = 0 (B) x = y (C) x = 0 (D) y = –x
(16)	Length of major and minor axis of ellipse $x^2 + 16y^2 = 16$ is : (A) 4 , 1 (B) 10 , 5 (C) 16 , 2 (D) 8 , 2
(17)	If eccentricity e > 1 then the conic is : (A) Hyperbola (B) Ellipse (C) Circle (D) Parabola
(18)	Direction Cosines of y – axis are : (A) (1 , 0 , 0) (B) (0 , 1 , 0) (C) (0 , 0 , 1) (D) (0 , 0 , 0)
(19)	$\lvert \underline{a} \times \underline{b} \rvert$ = : (A) Area of Triangle (B) Area of Circle (C) Area of Parallelogram (D) Area of Trapezium
(20)	Projection of Vector $\underline{r} = a\hat{i} + b\hat{j} + c\hat{k}$ on x – axis is : (A) a (B) b (C) c (D) $\sqrt{a^2 + b^2 + c^2}$

Roll No.	L.K. NO.1468– 20000	Inter (Part II)	Session (2020 –22) to (2022 – 24)
Mathematics (Subjective)	Inter (Ist – A – Exam 2024)		Time 2 : 30 Hours Marks : 80

Note : It is compulsory to attempt any (8 – 8) Parts each from Q.No. 2 and Q.No.3 while attempt any (9) Parts from Q.No.4. Attempt any (3) Questions from Part – II .Write same Question No. and its Part No. as given in the Question Paper.

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Part - I — 25 x 2 = 50

Q.No.2	(i)	Show that the Parametric Equations $x = at^2$, $y = 2at$ represent the Parabola $y^2 = 4ax$		
	(ii)	Evaluate $\lim_{x \to -\infty} \frac{2-3x}{\sqrt{3+4x^2}}$		
	(iii)	Evaluate $\lim_{x \to \infty} \left(\frac{x}{1+x}\right)^x$		
	(iv)	Express the Perimeter " P " of a square as a function of its area A .	(v)	Differentiate $\frac{2x-3}{2x+1}$ with respect to x
	(vi)	Differentiate $x^2 \operatorname{Sec} 4x$ w.r.t the variable involved.	(vii)	$Find \ \frac{dy}{dx}$ if : $4x^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$
	(viii)	$Find \ \frac{dy}{dx} \ if$ $x = at^2$ and $y = 2at$	(ix)	Differentiate ln ($x^2 + 2x$) w.r.t . ' x '
	(x)	Find y_2 if $y = \ln\left(\frac{2x+3}{3x+2}\right)$	(xi)	Expand a^x in the Maclaurin Series.
	(xii)	Find extreme values of $f(x) = 3x^2$		
Q.No.3	(i)	Find δy if $y = \sqrt{x}$ when ' x ' changes from 4 to 4.41	(ii)	Evaluate $\int \frac{ax+b}{ax^2+2bx+c} \, dx$
	(iii)	Evaluate $\int Cosec \, x \, dx$	(iv)	Evaluate $\int tan^{-1} x \, dx$
	(v)	Evaluate $\int_{-1}^{1} (x^{1/3} + 1) \, dx$	(vi)	Find the area between the x-axis and the curve $y = 4x - x^2$
	(vii)	Solve the Differential Equation $\frac{dy}{dx} = \frac{1-x}{y}$		
	(viii)	Find the Coordinates of the point that divides the join of A (– 6 , 3) and B (5 , – 2) in the ratio 2 : 3 externally .		
	(ix)	The coordinates of a point ' P ' are (– 6 , 9) . The axes are translated through the point O′ (– 3 , 2). Find the Coordinates of ' P ' referred to the new axes.		
	(x)	Convert $4x + 7y - 2 = 0$ into intercept form.		
	(xi)	Find the point of intersection of the lines $x + 4y - 12 = 0$ and $x - 3y + 3 = 0$		
	(xii)	Find the lines represented by $6x^2 - 19xy + 15y^2 = 0$		
Q.No.4	(i)	Draw the graph of linear inequality $2x \geq -3$ in xy – plane.		
	(ii)	Define the Optimal Solution.		
	(iii)	Find the Centre and Radius of the circle $x^2 + y^2 - 6x + 4y + 13 = 0$		
	(iv)	Write down equations of Tangent to circle $x^2 + y^2 = 25$ at (4 , 3)		
	(v)	Define Circle.		
	(vi)	Find an equation of Ellipse having Centre at (0 , 0) , Focus at (0 , – 3) and One Vertex at (0 , 4) .		

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	(vii)	Write equation of normal to the Parabola $x^2 = 16y$ at the point whose Abscissa is 8.
	(viii)	Find Centre and Vertices of conic $\frac{(y+2)^2}{9} - \frac{(x-2)^2}{16} = 1$
	(ix)	Find a vector whose magnitude is 2 and is parallel to $-\underline{i} + \underline{j} + \underline{k}$
	(x)	Calculate the projection of $\underline{b}$ along $\underline{a}$, when $\underline{a} = 3\underline{i} + \underline{j} - \underline{k}$, $\underline{b} = -2\underline{i} - \underline{j} + \underline{k}$
	(xi)	Find a vector perpendicular to each of the vectors $\underline{a} = 2\underline{i} + \underline{j} + \underline{k}$, $\underline{b} = 4\underline{i} + 2\underline{j} - \underline{k}$
	(xii)	Write Direction Cosines of a vector $\underline{r} = x\underline{i} + y\underline{j} + z\underline{k}$
	(xiii)	Find the volume of the parallelepiped determined by : $\underline{u} = \underline{i} - 2\underline{j} + 3\underline{k}$, $\underline{v} = 2\underline{i} - \underline{j} - \underline{k}$, $\underline{w} = \underline{j} + \underline{k}$

(Part – II) **3 x 10 = 30**

Q.No.5	(a)	If $f(x) = \begin{cases} 3x \text{ if } x \le -2 \\ x^2 - 1 \text{ if } -2 < x < 2 \\ 3 \text{ if } x \ge 2 \end{cases}$ Discuss Continuity at x = 2 and x = – 2	(5)
	(b)	Show that $\frac{dy}{dx} = \frac{y}{x}$ if $\frac{y}{x} = \tan^{-1}\left(\frac{x}{y}\right)$	(5)
Q.No.6	(a)	If $y = (\cos^{-1} x)^2$, Prove that $(1 - x^2) y_2 - xy_1 - 2 = 0$	(5)
	(b)	Evaluate the integral $\int \sqrt{4 - 5x^2}\, dx$	(5)
Q.No.7	(a)	Evaluate $\int_0^{\pi/4} \cos^4 t\, dt$	(5)
	(b)	Maximize the function defined as ; $f(x, y) = 2x + 3y$ subject to constraints $2x + y \le 8$; $x + 2y \le 14$; $x \ge 0$; $y \ge 0$	(5)
Q.No.8	(a)	Find equation of the tangent drawn from $(-1, 2)$ to $x^2 + y^2 + 4x + 2y = 0$	(5)
	(b)	Prove that Perpendicular Bisectors of the sides of a triangle are Concurrent	(5)
Q.No.9	(a)	Find the Centre, Foci, Eccentricity of Ellipse $x^2 + 16x + 4y^2 - 16y + 76 = 0$	(5)
	(b)	Find 'h' such that the points A (h, 1), B (2, 7) and C (– 6, –7) are vertices of a Right Triangle with Right Angle at the vertex A.	(5)