



Mathematics	(B)	L.K.No. 1074	Paper Code No. 8193
Paper II	(Objective Type)	Ist - A - Exam 2023	
Time :	30 Minutes	Inter (Part - II)	Session (2019 - 21) to (2021 - 23)
Marks :	20		

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

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Q.No. 1 (1)	Length of Vector $2\hat{i} - \hat{j} - 2\hat{k}$ is : (A) 3 (B) -3 (C) $\sqrt{5}$ (D) $-\sqrt{5}$
(2)	$ \cos\hat{i} + \sin\hat{j} + 0\hat{k} = :$ (A) 0 (B) 1 (C) 2 (D) -1
(3)	The vertices of Hyperbola $\frac{x^2}{4} - \frac{y^2}{9} = 1$ is : (A) $(0, \pm 3)$ (B) $(\pm 3, 0)$ (C) $(0, \pm 2)$ (D) $(\pm 2, 0)$
(4)	Co-Vertices of Ellipse $\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1 ; (a > b)$ are : (A) $(0, \pm a)$ (B) $(\pm a, 0)$ (C) $(0, \pm b)$ (D) $(\pm b, 0)$
(5)	Focus of the Parabola $x^2 = -16y$ is : (A) $(0, 4)$ (B) $(0, -4)$ (C) $(4, 0)$ (D) $(-4, 0)$
(6)	Length of Tangent from $(1, 1)$ to circle $x^2 + y^2 - 2x + 3y + 6 = 0$: (A) 1 (B) 2 (C) 3 (D) 4
(7)	$(0, 0)$ is not a solution of the inequality : (A) $x - y < 1$ (B) $2x + y < 1$ (C) $-2x + y + 1 > 0$ (D) $-2x + y < -1$
(8)	Equation of Horizontal Line through (a, b) is : (A) $x = a$ (B) $x = b$ (C) $y = a$ (D) $y = b$
(9)	Slope of line with inclination 45° is : (A) 1 (B) 0 (C) $\frac{1}{\sqrt{2}}$ (D) $\frac{1}{\sqrt{3}}$
(10)	The equation of line $\frac{x}{P\sec\alpha} + \frac{y}{P\csc\alpha} = 1$ is called : (A) Symmetric Form (B) Intercept Form (C) Normal Form (D) Slope Intercept Form
(11)	The solution of differential equation $xdy + ydx = 0$: (A) $y = \ln x + c$ (B) $y = \ln(cx)$ (C) $y = ce^x$ (D) $xy = a$
(12)	$\int e^{-x} (\cos x - \sin x) dx =$ (A) $e^{-x} \sin x + C$ (B) $e^{-x} \cos x + C$ (C) $-e^{-x} \sin x + C$ (D) $-e^{-x} \cos x + C$
(13)	$\int_{-\pi}^{\pi} \sin x dx = :$ (A) 1 (B) -1 (C) 2 (D) 0
(14)	$\int \frac{dx}{x \ln x} =$ (A) $\ln x + C$ (B) $\frac{1}{x} + C$ (C) $\ln(\ln x) + C$ (D) $\frac{(\ln x)^2}{2} + C$
(15)	If $f(x) = \sin x$ then $f'(\frac{\pi}{2}) =$ (A) -1 (B) 0 (C) 1 (D) ∞
(16)	$\sqrt{1-x^2} \frac{d}{dx} (\cos^{-1} x + \sin^{-1} x) =$ (A) 0 (B) 1 (C) $\frac{1}{\sqrt{1-x^2}}$ (D) $\frac{+2}{\sqrt{1-x^2}}$
(17)	$\frac{d}{dx} (e^x - e^{-x}) = :$ (A) $\sinh x$ (B) $\cosh x$ (C) $2 \sinh x$ (D) $2 \cosh x$
(18)	The derivative of $\frac{x^2 - 4}{x + 2}$ is equal to : (A) -2 (B) 2 (C) 1 (D) 0
(19)	$\lim_{x \rightarrow \infty} \frac{x + e}{x - e} = :$ (A) 0 (B) ∞ (C) 1 (D) -1
(20)	A function $f : x \rightarrow y$ defined by $f(x) = a$ is called : (A) Linear Function (B) Constant Function (C) Identity Function (D) Implicit Function



Roll No.	1074 - 24000	Inter (Part II)	Session (2019 -21) to (2021 - 23)
Mathematics (Subjective)	1st - A - Exam 2023		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.

Part - I

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25 x 2 = 50

Q.No.2	(i)	Define Even Function and give one example.	
	(ii)	Without finding Inverse ,state Domain and Range of f^{-1} where $f(x) = 2 + \sqrt{x-1}$	
	(iii)	Indicate Solution Region by shading the Inequality $3x + 7y \geq 21$	
	(iv)	Evaluate $\lim_{x \rightarrow 0} \frac{1 - \cos 2x}{x^2}$	(v) Find Derivative of $\sqrt{x}$ by definition.
	(vi)	Differentiate $\frac{(x^2 + 1)^2}{x^2 - 1}$ w.r.t. x	(vii) Find $\frac{dy}{dx}$ if $x^2 - 4xy - 5y = 0$
	(viii)	Differentiate $\cos \sqrt{x} + \sqrt{\sin x}$ w.r.t. x	(ix) If $f(x) = \ln(\sqrt{e^{2x} + e^{-2x}})$ then find $f'(x)$.
	(x)	If $y = \sinh^{-1} \frac{x}{2}$ then find $\frac{dy}{dx}$	(xi) If $x = at^2$, $y = bt^4$, then find y_2
	(xii)	Define Feasible Region and Feasible Solution.	
Q.No.3	(i)	Evaluate $\int \frac{ax + b}{ax^2 + 2bx + c} dx$	(ii) Evaluate $\int \sqrt{1 + \sin x} dx$
	(iii)	Evaluate $\int e^x (\cos x - \sin x) dx$	(iv) Evaluate $\int \frac{1}{x \ln x} dx$
	(v)	Evaluate $\int_{-1}^3 (x^3 + 3x^2) dx$	(vi) Evaluate $\int_0^3 \frac{dx}{x^2 + 9}$
	(vii)	Find the Integral $\int \frac{ax}{\sqrt{a^2 - x^4}} dx$	
	(viii)	Find Direction Cosine of $\underline{r} = x\hat{i} + y\hat{j} + z\hat{k}$	
	(ix)	Find a vector of length 5 in the direction opposite that of $\underline{y} = \hat{i} - 2\hat{j} + 3\hat{k}$	
	(x)	If $\underline{a} + \underline{b} + \underline{c} = 0$, then prove $\underline{a} \times \underline{b} = \underline{b} \times \underline{c} = \underline{c} \times \underline{a}$	
	(xi)	Find α so that $\alpha\hat{i} + \hat{j}$, $\hat{i} + \hat{j} + 3\hat{k}$ and $2\hat{i} + \hat{j} - 2\hat{k}$ are Coplaner.	
	(xii)	Find the volume of Parallelepiped for $\underline{u} = \hat{i} - 2\hat{j} + 3\hat{k}$, $\underline{v} = 2\hat{i} - \hat{j} - \hat{k}$, $\underline{w} = \hat{j} + \hat{k}$	
Q.No.4	(i)	The Coordinates of a point P are $(-2, 6)$. The axes are translated through the point $O'(-3, 2)$. Find the Coordinates of Point P referred to new axes.	
	(ii)	By means of slopes show that the points A $(-4, 6)$, B $(3, 8)$, C $(10, 10)$ lie on the same line.	
	(iii)	Find the equation of Horizontal Line through $(7, -9)$	
	(iv)	Find the distance between the parallel lines $3x - 4y + 3 = 0$, $3x - 4y + 7 = 0$	
	(v)	Whether point P $(5, 8)$ lies above or below the line $2x - 3y + 6 = 0$	
	(vi)	Find the Area of a Triangular Region whose vertices are A $(5, 3)$, B $(-2, 2)$, C $(4, 2)$	
	(vii)	Find the lines represented by $9x^2 + 24xy + 16y^2 = 0$	
	(viii)	Find the equation of a Circle centre at $(5, -2)$ and Radius is 4	

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(ix)	Find the equation of Normal to the Circle $x^2 + y^2 = 25$ at $(5 \cos \theta, 5 \sin \theta)$
(x)	Find the length of Tangent drawn from $(-5, 4)$ to the Circle $5x^2 + 5y^2 - 10x + 15y - 131 = 0$
(xi)	Find the Equation of Parabola with Focus $(2, 2)$ and Directrix is $x = -2$
(xii)	Find Foci and Vertices of an Ellipse $x^2 + 4y^2 = 16$
(xiii)	Find the Equation of Hyperbola with Foci $(\pm 5, 0)$, Vertex $(3, 0)$

(Part - II)

3 x 10 = 30

Q.No.5	(a)	Evaluate the Limit $\lim_{x \rightarrow 0} \frac{e^{1/x} - 1}{e^{1/x} + 1}$; $x < 0$	(5)
	(b)	Differentiate w.r.t. x , $\sec^{-1} \left(\frac{x^2 + 1}{x^2 - 1} \right)$	(5)
Q.No.6	(a)	Evaluate $\int \frac{2x}{1 - \sin x} dx$	(5)
	(b)	Find an Equation of the Perpendicular bisector of the Segment Joining the points $A(3, 5)$ and $B(9, 8)$	(5)
Q.No.7	(a)	Find the area between the x -axis and the curve $y = \sqrt{2ax - x^2}$ When $a > 0$	(5)
	(b)	Graph the feasible region of the following system of Linear Inequalities and find the Corner Points : $2x + 3y \leq 18$ $x + 4y \leq 12$ $3x + y \leq 12$ $x \geq 0, y \geq 0$	(5)
Q.No.8	(a)	If $y = e^x \sin x$, then show that $\frac{d^2y}{dx^2} - 2 \frac{dy}{dx} + 2y = 0$	(5)
	(b)	Find an Equation of the Circle passing through $A(3, -1)$, $B(0, 1)$ and having Centre at $4x - 3y - 3 = 0$	(5)
Q.No.9	(a)	Find the Focus, Vertex and Directrix of Parabola. Sketch the graph $x^2 - 4x - 8y + 4 = 0$	(5)
	(b)	By Vector Method, prove that in any Triangle $b^2 = c^2 + a^2 - 2ca \cos B$	(5)
			