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		

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 $\text{Sin}^2 x$ with respect to $\text{Cos}^2 x$ is : (A) −1 (B) 1 (C) tanx (D) cotx
(6)	Derivative of $\text{Sinh}^{-1} x$ 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 Ouestion No. and its Part No. as given in the Question Paper.

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 $x^2 \sec 4x$ 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 $f(x) = \begin{cases} 3x \ if \ x \le -2 \\ x^2 - 1 \ if -2 < x < 2 \\ 3 \ if \ x \ge 2 \end{cases}$ 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)

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.

Q.No.	
1 (1)	Length of Vector $2\underline{i} - \underline{j} - 2\underline{k}$ is : (A) 3 (B) −3 (C) $\sqrt{5}$ (D) $-\sqrt{5}$
(2)	$\lvert Cos\alpha\underline{i} + Sin\alpha\underline{j} + 0\,\underline{K} \rvert$ = : (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, ± 3) (B) (± 3, 0) (C) (0, ± 2) (D) (± 2, 0)
(4)	Co – Vertices of Ellipse $\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1$; (a > b) are : (A) (0, ± a) (B) (± a, 0) (C) (0, ± b) (D) (± 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 $\frac{x}{PSec\alpha} + \frac{y}{PCosec\alpha} = 1$ 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) $y = lnx + c$ (B) $y = ln(cx)$ (C) $y = ce^x$ (D) $xy = a$
(12)	$\int e^{-x}(Cosx - Sinx)dx =$ (A) $e^{-x}Sinx + C$ (B) $e^{-x}Cosx + C$ (C) $-e^{-x}Sinx + C$ (D) $-e^{-x}Cosx + C$
(13)	$\int_{-\pi}^{\pi} Sinxdx$ = : (A) 1 (B) −1 (C) 2 (D) 0
(14)	$\int \frac{dx}{xlnx}$ = (A) $lnx + C$ (B) $\frac{1}{x} + c$ (C) $ln(lnx) + C$ (D) $\frac{(lnx)^2}{2} + c$
(15)	If f(x) = Sinx 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) Sinhx (B) Coshx (C) 2 Sinhx (D) 2 Coshx
(18)	The derivative of $\frac{x^2-4}{x+2}$ is equal to : (A) −2 (B) 2 (C) 1 (D) 0
(19)	$Lim_{x\to\infty} \frac{x+e}{x-e}$ = : (A) 0 (B) ∞ (C) 1 (D) −1
(20)	A function f : x ⟶ 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)	Ist – 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 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 $\text{Lim}_{x\to 0} \frac{1-Cos2x}{x^2}$	(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 $Cos\sqrt{x} + \sqrt{Sinx}$ w.r.t. ' x '	(ix)	If $f(x) = \ln(\sqrt{e^{2x} + e^{-2x}})$ then find $f'(x)$.
	(x)	If $y = \text{Sinh}^{-1}\frac{x}{2}$ 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 $\int \sqrt{1+Sinx}\,dx$
	(iii)	Evaluate $\int e^x(Cosx - Sinx)dx$	(iv)	Evaluate $\int \frac{1}{x\,lnx}\,dx$
	(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 $\underline{v} = \hat{i} - 2\hat{j} + 3\hat{k}$		
	(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 $\text{Lim}_{x\to 0} \frac{e^{1/x} - 1}{e^{1/x} + 1}$; $x < 0$	(5)
	(b)	Differentiate w.r.t. x, $Sec^{-1}\left(\frac{x^2+1}{x^2-1}\right)$	(5)
Q.No.6	(a)	Evaluate $\int \frac{2x}{1 - Sinx}\, dx$	(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 $y = e^x \text{Sin}x$, 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)

Mathematics	(D)	L.K.No. 1312	Paper Code No. 8197
Paper II	(Objective Type)	Inter – A – 2022	
Time :	30 Minutes	Inter (Part - II)	Session (2018 - 20) to (2020 – 22)
Marks :	20	Bahawalpur Board-2022	

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.

Q.No.1 (1)	$\text{Lim}_{n\to\infty}\ (1-\frac{1}{n})^n$ = :	(A) e (B) e^2 (C) e^{-1} (D) $\frac{-1}{e}$
(2)	If f(x) = $\frac{1}{x-1}$ then f(2) =	(A) -1 (B) 1 (C) 0 (D) -2
(3)	$\frac{d}{dx}(y^n)$ = :	(A) ny^{n-1} (B) ny^{n+1} (C) $ny^{n-1}\frac{dy}{dx}$ (D) $ny^{n-1}\frac{dx}{dy}$
(4)	$\text{Lim}_{x\to 0}\left(\frac{e^x-1}{x}\right)$ = :	(A) 1 (B) 0 (C) e (D) ∞
(5)	$\frac{d}{dx}Cotax$ = :	(A) Cosec^2ax (B) aCosec^2ax (C) – aCosec^2ax (D) – aCosec ax
(6)	$\int 3^{\lambda x}\,dx$ = :	(A) $\frac{3^{\lambda x}}{ln3}$ (B) $3^{\lambda x}\,ln3$ (C) $\frac{1}{\lambda}\frac{3^{\lambda x}}{ln3}$ (D) $3^{\lambda x}$
(7)	$\int\frac{dx}{a^2+x^2}$ = :	(A) $\frac{1}{a}Tan^{-1}\frac{x}{a}+C$ (B) $\frac{1}{2a}\ln\frac{x-a}{x+a}$ (C) $\frac{1}{2a}\ln\frac{x+a}{x-a}$ (D) $\frac{1}{a}\ln(a^2+x^2)$
(8)	$\frac{d}{dx}(3^x)$ = :	(A) $3^x ln3$ (B) 3^x (C) $x\,3^{x-1}$ (D) 3^{x+1}
(9)	$\int e^x(Cos\,x+Sin\,x)dx$ = :	(A) $-e^x$ Sin x (B) e^x Cos x (C) $-e^x$ Cos x (D) e^x Sin x
(10)	Slope of the line ax + by + c = 0 is :	(A) $\frac{a}{b}$ (B) $\frac{-b}{a}$ (C) $\frac{-a}{b}$ (D) $\frac{a}{c}$
(11)	Distance of the point (2,3) from y – axis is :	(A) 4 (B) 2 (C) –2 (D) 5
(12)	$\int_{-\pi}^{\pi} Sinx\,dx$ = :	(A) 0 (B) 9 (C) 1 (D) 2
(13)	Equation of Horizontal Line through (7,–9) is :	(A) y = –9 (B) y = 7 (C) x = –9 (D) x = 7
(14)	A Circle is called a point circle if :	(A) r = 1 (B) r = 0 (C) r = 2 (D) r = 3
(15)	If m_1 and m_2 are the slopes of two lines, then lines are perpendicular if :	(A) $m_1m_2 = 0$ (B) $m_1m_2 + 1 = 0$ (C) $m_1m_2 + 2 = 0$ (D) $m_1 = m_2$
(16)	The point (–1,2) satisfied the inequality :	(A) x – y > 4 (B) x – y ≥ 4 (C) x + y < 4 (D) x + y > 5
(17)	The length of Diameter of circle $x^2 + y^2 = 9$ is :	(A) 6 (B) 3 (C) $\sqrt{3}$ (D) 9
(18)	The non – zero vectors $\underline{a}$ and $\underline{b}$ are parallel if $\underline{a} \times \underline{b}$ = :	(A) 1 (B) –1 (C) 0 (D) 2
(19)	$\hat{j} \times \hat{k}$ = :	(A) $\hat{i}$ (B) $-\hat{i}$ (C) 0 (D) $\hat{k}$
(20)	Eccentricity of an Ellipse is :	(A) e = 0 (B) e > 1 (C) 0 < e < 1 (D) e = 1

Roll No.	1312 – I 8000	Session (2018 –20) to (2020 – 22)	Inter (Part – II)
Mathematics (Subjective)	Inter – A – 2022	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 $25 \times 2 = 50$

Q.No.2	(i)	Express the volume **v** of a cube as a function of the area of its base.		
	(ii)	If $f(x) = \|x-5\|$ then find Left Hand and Right Hand limits of $f(x)$ at $x = 5$		
	(iii)	Find Domain and Range of f^{-1} without finding inverse of $f(x)$ if $f(x) = \frac{x-1}{x-4}$, $x \neq 4$		
	(iv)	Find $f(x)$ if $f(x) = x^2 \ln \frac{1}{x}$	(v)	Find the limit $\text{Lim}_{x\to 0} \frac{1-Cos2x}{x^2}$
	(vi)	Differentiate $\frac{a+x}{a-x}$ w.r.t. "x"	(vii)	If $x = at^2$ and $y = 2at$ then find $\frac{dy}{dx}$
	(viii)	Find the $\text{Lim}_{x\to 2} \frac{x^3-8}{x^2+x-6}$	(ix)	If $y^3 + 3ax^2 + x^3 = 0$, then find y_2.
	(x)	Define Critical Value and Critical Point.	(xi)	Find derivative of $(x^3+1)^9$ w.r.t. "x"
	(xii)	Differentiate $\frac{1}{a} \text{Sin}^{-1} \frac{a}{x}$ w.r.t. "x"		
Q.No.3	(i)	Use differential to approximate the value of $\text{Cos}29^0$.		
	(ii)	Find δy and dy of $y = x^2 - 1$ when x changes from 3 to 3.02.		
	(iii)	Using differentials find $\frac{dy}{dx}$ and $\frac{dx}{dy}$ of $xy - \ln x = c$		
	(iv)	Solve the differential equation $(e^x + e^{-x})\frac{dy}{dx} = e^x - e^{-x}$		
	(v)	Evaluate $\int \frac{1-x^2}{1+x^2} dx$	(vi)	Evaluate $\int \frac{x}{\sqrt{4+x^2}} dx$
	(vii)	Evaluate $\int_1^2 (x^2+1)dx$	(viii)	Evaluate $\int_0^{\pi/3} Cos^2\theta \, Sin\theta \, d\theta$
	(ix)	Find an equation of line through $(-5,-3),(9,-1)$	(x)	By means of slopes, show that the points $(-1,-3),(1,5),(2,9)$ lie on the same line.
	(xi)	Find the distance from the point $P(6,-1)$ to the line $6x-4y+9=0$	(xii)	Find the lines represented by $2x^2 + 3xy - 5y^2 = 0$
Q.No.4	(i)	Define an Objective Function.		
	(ii)	Graph the solution set of Linear Inequality in xy – plane : $3y - 4 \leq 0$		
	(iii)	Find the equation of circle with centre $(\sqrt{2}, -3\sqrt{3})$ and Radius $2\sqrt{2}$		
	(iv)	Find the Centre and Radius of a circle $x^2 + y^2 + 12x - 10y = 0$		
	(v)	Find the equation of Tangent to the circle $x^2 + y^2 = 25$ at point $(4,3)$		
	(vi)	Find Focus and Directrix of Parabola $x^2 = 4(y-1)$		
	(vii)	Find Centre and vertices of the ellipse $9x^2 + y^2 = 18$		
	(viii)	Find the Eccentricity and Foci of Hyperbola $\frac{y^2}{16} - \frac{x^2}{49} = 1$		
	(ix)	Write the vector $\overrightarrow{PQ}$ in the form of $x\hat{i} + y\hat{j}$ when $P = (2,3)$, $Q = (6,-2)$		

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	(x)	Find α so that $\lvert \alpha\hat{i} + (\alpha+1)\hat{j} + 2\hat{k} \rvert = 3$
	(xi)	Find the Direction Cosines of the vector $\vec{v} = 3\hat{i} - \hat{j} + 2\hat{k}$
	(xii)	Find the Cosine of Angle between $\vec{u} = [2,-3,1]$, $\vec{v} = [2,4,1]$
	(xiii)	Find the value of $3\hat{j} \cdot \hat{k} \times \hat{i}$

(Part – II) **10 x 3 = 30**

Q.No.5	(a)	Evaluate $\lim_{x\to 0} \frac{x}{\tan x}$	(5)
	(b)	If $y = \sqrt{x} - \frac{1}{\sqrt{x}}$, show that $2x\frac{dy}{dx} + y = 2\sqrt{x}$	(5)
Q.No.6	(a)	Evaluate $\int e^x \left(\frac{1+\sin x}{1+\cos x}\right) dx$	(5)
	(b)	Find equations of two parallel lines perpendicular to $2x - y + 3 = 0$ such that the product of the x and y intercepts of each is 3.	(5)
Q.No.7	(a)	Evaluate $\int_{\frac{\pi}{6}}^{\frac{\pi}{2}} \frac{\cos x}{\sin x(2+\sin x)} dx$	(5)
	(b)	Minimize $z = 3x + y$; subject to the constraints $3x + 5y \geq 15$; $x + 6y \geq 9$; $x \geq 0$; $y \geq 0$	(5)
Q.No.8	(a)	Find a joint equation of the straight lines through the origin and perpendicular to the lines represented by $x^2 + xy - 6y^2 = 0$	(5)
	(b)	Show that the circles $x^2 + y^2 + 2x - 2y - 7 = 0$ and $x^2 + y^2 - 6x + 4y + 9 = 0$ touch externally	(5)
Q.No.9	(a)	Find Equations of the Tangents of the Ellipse $\frac{x^2}{128} + \frac{y^2}{18} = 1$ which are parallel to the line $3x + 8y + 1 = 0$. Also find the points of Contact.	(5)
	(b)	Prove that $\sin(\alpha + \beta) = \sin\alpha\cos\beta + \cos\alpha\sin\beta$	(5)

Mathematics	(D)	L.K.No. 1312	Paper Code No. 8197
Paper II	(Objective Type)	Inter – A – 2021	Session (2017 -19) to (2020 – 22)
Time :	30 Minutes	Inter (Part II)	

Q.No.1	
(1)	$\text{Lim}_{x \to 3} \sqrt{x^2 + x + 4}$ = : (A) 4 (B) – 4 (C) 6 (D) 0
(2)	$\frac{d}{dx}(\text{Sin}^{-1} x) =$: (A) $\frac{-1}{\sqrt{1-x^2}}$ (B) $\frac{1}{1+x^2}$ (C) $\frac{-1}{1+x^2}$ (D) $\frac{1}{\sqrt{1-x^2}}$
(3)	$\frac{d}{dx}(Sinx) =$: (A) $-Cos\,x$ (B) $Cos\,x$ (C) $tan\,x$ (D) $Sec\,x$
(4)	$\text{Lim}_{x \to 0} \frac{Sinax}{Sinbx}$ = : (A) $\frac{b}{a}$ (B) 1 (C) $\frac{a}{b}$ (D) $\frac{-a}{b}$
(5)	$1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!}$ + ----- is the Maclaurin's Series Expansion of : (A) Sin x (B) Cos x (C) e^x (D) e^{2x}
(6)	$\int \frac{1}{x} dx$: (A) $\frac{x^{-2}}{-2} + C$ (B) $\frac{x^0}{0} + C$ (C) $\frac{1}{x^2} + C$ (D) ln x + C
(7)	$\int tan^2 x\, dx$ = : (A) 2 tan x + c (B) tan x – c (C) tan x + x + c (D) tan x – x + c
(8)	If $f(x) = a^x$ then $f'(x)$ = : (A) a^x lna (B) a^x (C) $x\,a^{x-1}$ (D) $\frac{a^x}{lna}$
(9)	$\int Cosecx dx$: (A) Cosec x Cot x + C (B) ln (Cosec x – Cot x) + C (C) ln (Cosec x + Cot x) + C (D) ln (Sec x + tan x) + C
(10)	Slope of line 2y = x – 7 is : (A) $\frac{1}{2}$ (B) 2 (C) $\frac{-1}{2}$ (D) – 2
(11)	The distance of the point (2 , 3) from y – axis is : (A) 3 (B) 2 (C) – 2 (D) – 3
(12)	$\int e^x$ (Cosx + Sinx) dx : (A) $e^x Sinx + C$ (B) $e^x Cosx + C$ (C) $-e^x Cosx + C$ (D) $-e^x Sinx + C$
(13)	Point Slope form of equation of Straight line is : (A) y = mx + c (B) $y - y_1 = m(x - x_1)$ (C) $\frac{x}{a} + \frac{y}{b} = 1$ (D) x Cosα + y Sinα = P
(14)	$\hat{k} \times \hat{j}$: (A) $\underline{i}$ (B) $-\underline{i}$ (C) 1 (D) 0
(15)	If $\underline{u} = 2\underline{i} - \underline{j} + 4\underline{k}$ then $\underline{u} \times \underline{v}$: (A) 8 (B) 1 (C) –1 (D) 0
(16)	Which of the following is the solution of inequality x + 2y < 6 : (A) (4 , 1) (B) (1 , 3) (C) (3 , 3) (D) (1 , 4)
(17)	If $\underline{v} = \underline{i} - \underline{j} - \underline{k}$ then $\lvert\underline{v}\rvert$: (A) $\sqrt{3}$ (B) 3 (C) 9 (D) 1
(18)	The equation $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ represents : (A) Hyperbola (B) Circle (C) Parabola (D) Ellipse
(19)	The Conic is a Hyperbola if Eccentricity is : (A) $e = 1$ (B) $0 < e < 1$ (C) $e > 1$ (D) $e = \frac{1}{2}$
(20)	Directrix of the Parabola $x^2 = -4ay$ is : (A) x = a (B) x = – a (C) y = a (D) y = – a

Roll No.	1312 - 24000	Session (2017 –19) to (2020 – 22)	Inter (Part – II)
Mathematics (Subjective)	Inter – A – 2021	Time 2 : 30 Hours Marks : 80	

Note: It is compulsory to attempt any(8 – 8)Parts each from Q No 4 ... | Part - I | 25 x 2 = 50

Q.No.2	(i)	Given $f(x) = x^3 - ax^2 + bx + 1$, if $f(2) = -3$ and $f(-1) = 0$ find the values of a and b.		
	(ii)	Evaluate $\lim_{x\to 3} \frac{x-3}{\sqrt{x}-\sqrt{3}}$	(iii)	Evaluate $\lim_{x\to 0} \frac{1-Cosx}{Sin^2x}$
	(iv)	Find $\frac{dy}{dx}$ if $y = \frac{x}{lnx}$	(v)	Find y_2 if $y = \sqrt{x} + \frac{1}{\sqrt{x}}$
	(vi)	Prove that $\frac{d}{dx} Sec^{-1}x = \frac{1}{\lvert x\rvert\sqrt{x^2-1}}$	(vii)	Differentiate $\frac{x^2+1}{x^2-3}$
	(viii)	Find $\acute{f}(x)$ if $f(x) = \ln(\sqrt{e^{2x} + e^{-2x}})$	(ix)	For real valued function f, find $f^{-1}(-1)$ $f(x) = \frac{2x+1}{x-1}$ $x > 1$
	(x)	Differentiate w.r.t. 'x' $Sin^{-1}\sqrt{1-x^2}$	(xi)	Differentiate w.r.t. 'x'; $y = e^{-2x} Sin2x$
	(xii)	If $y = x^4 + 2x^2 + 2$ prove that $\frac{dy}{dx} = 4x\sqrt{y-1}$		
Q.No.3	(i)	Find δy of $y = f(x) = x^2$, when $x = 2$ and $dx = 0.01$		
	(ii)	Find the area between the x – axis and the curve $y = x^2 + 1$ from $x = 1$ to $x = 2$		
	(iii)	Show that the points A(0, 2), B($\sqrt{3}$, –1) and C(0, –2) are vertices of right triangle.		
	(iv)	Check whether the point (5, 8) lies above or below the line $2x - 3y + 6 = 0$		
	(v)	Evaluate $\int \frac{e^x}{e^x+3} dx$	(vi)	Evaluate $\int Sin^2x\, dx$
	(vii)	Evaluate $\int x\, lnx\, dx$	(viii)	Evaluate $\int_1^2 (x^2 + 1)dx$
	(ix)	Evaluate $\int (2x+3)^{\frac{1}{2}} dx$	(x)	Solve the Differential Equation $\frac{dy}{dx} = \frac{1-x}{y}$
	(xi)	Find an equation of vertical line through (–5, 3)	(xii)	Find the equation of lines represented by $3x^2 + 7xy + 2y^2 = 0$
Q.No.4	(i)	Graph the Solution Set of $2x + y \leq 6$		
	(ii)	Find the Centre and Foci of $\frac{x^2}{4} - \frac{y^2}{9} = 1$		
	(iii)	Find the Centre and Radius of Circle $5x^2 + 5y^2 + 14x + 12y - 10 = 0$		
	(iv)	Write the equation of Tangent and Normal to the circle $x^2 + y^2 = 25$ at (4, 3)		
	(v)	Find the Focus and Vertex of the Parabola $x^2 = -16y$		
	(vi)	Find point of Intersection of Conics $x^2 + y^2 = 8$ and $x^2 - y^2 = 1$		
	(vii)	Find equation of Parabola if Focus is (–3, 1) and Directrix $x = 3$		
	(viii)	Find a Unit Vector in the Direction of $\underline{v} = \frac{1}{2}\underline{i} + \frac{\sqrt{3}}{2}\underline{j}$		
	(ix)	Find α, so that $\lvert\alpha\underline{i} + (\alpha+1)\underline{j} + 2\underline{k}\rvert = 3$		
	(x)	Find Cosine of angle between the vectors $\underline{u} = [2, -3, 1]$ and $\underline{v} = [2, 4, 1]$		

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	(xi)	Find Area of Parallelogram with vertices A(1,2,−1), B(4,2,−3), C(6,−5,2) and D(9,−5,0)	
	(xii)	Find α if $\underline{i} - \underline{j} + \underline{k}$, $\underline{i} - 2\underline{j} - 3\underline{k}$ and $3\underline{i} - \alpha\underline{j} + 5\underline{k}$ are Coplanar.	
	(xiii)	Find the Direction Cosines of $\underline{v} = 3\underline{i} - \underline{j} + 2\underline{k}$	

(Part – II)

Q.No.5	(a)	Find values of m and n so that $f(x) = \begin{cases} mx & \text{if } x < 3 \\ n & \text{if } x = 3 \\ -2x+9 & \text{if } x > 3 \end{cases}$ is continuous at x = 3	(5)
	(b)	If $\tan y(1 + \tan x) = 1 - \tan x$, then show that $\frac{dy}{dx} = -1$	(5)
Q.No.6	(a)	Find $\int Tan^3x \, . Secx \, dx$	(5)
	(b)	Find h such that the points A(h,1), B(2,7) and C(−6,−7) are the vertices of a Right Triangle with Right Angle at the Vertex A.	(5)
Q.No.7	(a)	Evaluate $\int_{-1}^{2} (x + \lvert x \rvert)\, dx$	(5)
	(b)	Minimize $z = 3x + y$ subject to constraints $3x + 5y \geq 15$, $x + 6y \geq 9$ $x \geq 0, y \geq 0$	(5)
Q.No.8	(a)	Show that the Circles $x^2 + y^2 + 2x - 2y - 7 = 0$ and $x^2 + y^2 - 6x + 4y + 9 = 0$ touch externally.	(5)
	(b)	Use Vectors Method, prove that in any Triangle ABC, $a^2 = b^2 + c^2 - 2bcCosA$	(5)
Q.No.9	(a)	If $y = a\,Cos(\ln x) + b\,Sin(\ln x)$ prove that $x^2 \frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = 0$	(5)
	(b)	A Parabolic Arch has a 100 m base and height 25 m. Find the height of the arch at the point 30 m from the centre of the base.	(5)

Paper II	(Objective Type)	Inter –A- 2019	Session (2015 -17) to (2017 – 19)
Time :	30 Minutes	Inter (Part II)	
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.

1 Projection of $\vec{u} = a\,\underline{i} + b\,\underline{j} + c\,\underline{k}$ along $\underline{i}$ is : (A) b (B) a (C) c (D) a + b

$\underline{K} \times \underline{i}$ equals : (A) $\underline{j}$ (B) $\underline{k}$ (C) 1 (D) 0

Slope of tangent to parabola $y^2 = 4ax$ at $(a, 2a)$ is : (A) 3 (B) 2 (C) -1 (D) 1

Focus of the Parabola $x^2 = 4ay$ is : (A) $(a, 0)$ (B) $(-a, 0)$ (C) $(0, a)$ (D) $(0, -a)$

The length of diameter of the circle $x^2 + y^2 - 4x - 12 = 0$ is : (A) 6 (B) 7 (C) 8 (D) 9

The Graph of the Inequality $ax + by < c$ is :
(A) Circle (B) Parabola (C) Straight Line (D) Half Plane

The perpendicular distance of the line $3x + 4y + 5 = 0$ from the origin is :
(A) 0 (B) 1 (C) 2 (D) 5

Equation of the line having slope -5 and y- intercept -7 is :
(A) $5x + y + 7 = 0$ (B) $5x - y + 7 = 0$ (C) $5x + y - 7 = 0$ (D) $7x + y + 5 = 0$

When a line intersects the y – axis at $(0, 4)$ then y- intercept is :
(A) 4 (B) 2 (C) 0 (D) 6

Slope of the Line Perpendicular to line $2x - 3y + 1 = 0$ is equal to :
(A) $\frac{3}{2}$ (B) $-\frac{3}{2}$ (C) $\frac{2}{3}$ (D) $-\frac{2}{3}$

Solution of Differential Equation $\frac{dy}{dx} = \text{Sec}^2 x$ is :
(A) $y = \text{Cot}\,x + c$ (B) $y = \tan x + c$ (C) $y = \text{Cos}\,x + c$ (D) $y = -\tan x + c$

If $\int_2^K 2\,dx = 12$, then K = ? : (A) 12 (B) 16 (C) 8 (D) 4

$\int \frac{dx}{\sqrt{5 - x^2}}$ = : (A) $\text{Sin}^{-1}\frac{5}{x}$ (B) $\sin^{-1}\frac{x}{\sqrt{5}}$ (C) $\text{Sin}^{-1}\frac{x}{5}$ (D) $\sin^{-1}\frac{\sqrt{5}}{x}$

$\int \text{Sec}^2 x \tan x\,dx$ =
(A) $\text{Sec}\,x \tan^2 x + c$ (B) $\frac{Sec^3 x}{3} + c$ (C) $\frac{Sec^3 x \tan x}{3} + c$ (D) $\frac{\tan^2 x}{2} + c$

If $y = \ln e^x$, then $\frac{dy}{dx}$ = : (A) e^x (B) $\frac{1}{e^x}$ (C) 1 (D) e^{x-1}

The Derivative of x^3 w.r.t. x^2 is equal to : (A) $\frac{3x^2}{2}$ (B) $\frac{3x}{2}$ (C) $\frac{2}{3x}$ (D) $\frac{2}{3x^2}$

$\frac{d}{dx}(2x^2 + 3)^5$ =
(A) $(2x^2 + 3)^4\,20x$ (B) $20(2x^2 + 3)^5$ (C) $15(2x^2 + 3)^5$ (D) $(2x^2 + 3)^5\,100x$

Which one is Leibniz Notation for Derivative of f(x) :
(A) $\frac{df}{dx}$ (B) $f'(x)$ (C) $\frac{d}{dx}$ (D) $Df(x)$

$\lim_{x \to -1} \frac{x^3 - x}{x + 1}$ = : (A) 0 (B) ∞ (C) 2 (D) 1

If P is perimeter of square and A is area then P = :
(A) $2\sqrt{A}$ (B) 4A (C) $4\sqrt{A}$ (D) A^2

Mathematics (Subjective)	Inter – A -2019	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 **25 x 2 = 50**

Q.No.2	(i)	Express the area 'A' of a circle as a function of its circumference 'C'.		
	(ii)	Define Odd Function and give an example.	(iii)	Prove that $\lim_{x \to 0} \frac{\sqrt{x+a} - \sqrt{a}}{x} = \frac{1}{2\sqrt{a}}$
	(iv)	Find the derivative of $f(x) = c$ by definition.	(v)	If $y = x^4 + 2x^2 + 2$ prove that $\frac{dy}{dx} = 4x\sqrt{y-1}$
	(vi)	Find $\frac{dy}{dx}$ if $y = \sqrt{x+\sqrt{x}}$	(vii)	Differentiate $\cos^{-1}\frac{x}{a}$ w.r.t. 'x'.
	(viii)	Differentiate $x^2 \sec 4x$ w.r.t. 'x'.	(ix)	Find $\frac{dy}{dx}$ if $y = a^{\sqrt{x}}$
	(x)	Find y_2 if $y = 2x^5 - 3x^4 + 4x^3 + x - 2$	(xi)	Find $\frac{dy}{dx}$ if $y = x\,e^{\sin x}$
	(xii)	Find $\frac{dy}{dx}$ if $y = \frac{x}{\ln x}$		
Q.No.3	(i)	Find δy and dy if $y = \sqrt{x}$ when x changes from 4 to 4.41		
	(ii)	Find the area above the x-axis and under the curve $y = 5 - x^2$ from $x = -1$ to $x = 2$		
	(iii)	Graph the solution set of linear inequality $2x + 1 \geq 0$ in xy-plane.		
	(iv)	Using differentials find $\frac{dy}{dx}$ and $\frac{dx}{dy}$ if $xy + x = 4$		
	(v)	Define the Definite Integral.	(vi)	Solve the differential equation $ydx + xdy = 0$
	(vii)	Evaluate $\int \frac{\cos x}{\sin x \ln \sin x} dx$	(viii)	Evaluate $\int x \ln x\, dx$
	(ix)	Define Corner Point of Solution Region.	(x)	Evaluate $\int \sec^4 x\, dx$
	(xi)	Evaluate $\int_{-2}^{0} \frac{1}{(2x-1)^2} dx$	(xii)	Solve $\frac{dy}{dx} = \frac{y^2+1}{e^{-x}}$
.No.4	(i)	Show that the points A(0,2), B($\sqrt{3}$,-1) and C(0,-2) are vertices of a right triangle.		
	(ii)	Find equation of the line through (-4,7) and parallel to $2x - 7y + 4 = 0$		
	(iii)	Find angle from line with slope $\frac{-7}{3}$ to line with slope $\frac{5}{2}$		
	(iv)	Find length of tangent from the point P(-5,10) to circle $5x^2 + 5y^2 + 14x + 12y - 10 = 0$		
	(v)	Find Vertex of Parabola $(x-1)^2 = 8(y+2)$		
	(vi)	Find Equation of Hyperbola with Foci (±4,0), Vertices (±2,0).		
	(vii)	If $\overrightarrow{AB} = \overrightarrow{CD}$, find A if B(1,2), C(-2,5), D(4,11) are given points.		
	(viii)	If $\underline{u} = \alpha\underline{i} + 2\alpha\underline{j} - \underline{k}$, $\underline{v} = \underline{i} + \alpha\underline{j} + 3\underline{k}$ are perpendicular vectors, find value of α.		
	(ix)	Find vector perpendicular to each of vectors $\underline{a} = 2\underline{i} + \underline{j} + \underline{k}$, $\underline{b} = 4\underline{i} + 2\underline{j} - \underline{k}$		
	(x)	Find volume of parallelepiped determined by : $\underline{u} = \underline{i} + 2\underline{j} - \underline{k}$, $\underline{v} = \underline{i} - 2\underline{j} + 3\underline{k}$, $\underline{w} = \underline{i} - 7\underline{j} - 4\underline{k}$		
	(xi)	Define Trapezium.		
	(xii)	Define Ellipse.		
	(xiii)	Define Directional Angles.		

.No.1319

(Part – II)

).5	(a)	Discuss the continuity of $f(x)$ at $x = 2$ $f(x) = \begin{cases} x^2 - 1 & x < 2 \\ 3 & x \geq 2 \end{cases}$	(5)
	(b)	Discuss the function $f(x) = \sin x + \frac{1}{2\sqrt{2}} Cos2x$ for extreme values in the interval $(0, 2\pi)$	(5)
o.6	(a)	Evaluate the Integral $\int \frac{2x^2}{(x-1)^2(x+1)} dx$	(5)
	(b)	Find the point three – fifth of the way along the line segment from A(-5, 8) to B(5, 3)	(5)
lo.7	(a)	Solve the differential equation $\frac{dy}{dx} + \frac{2xy}{2y+1} = x$	(5)
	(b)	Minimize $z = 3x + y$ Subject to the constraints $3x + 5y \geq 15$ $x + 6y \geq 9$ $x \geq 0, y \geq 0$	(5)
No.8	(a)	Find a joint equation of the lines through the origin and perpendicular to the lines $x^2 - 2xy \tan\alpha - y^2 = 0$	(5)
	(b)	Find equation of the circle of radius 2 and tangent to the line $x - y - 4 = 0$ at A(1, -3)	(5)
No.9	(a)	Find the Centre, Foci, Eccentricity, Vertices and equations of diretrices of : $\frac{x^2}{4} - \frac{y^2}{9} = 1$	(5)
	(b)	Find a Unit Vector Perpendicular to the plane containing vectors $\underline{a} = 2\underline{i} - 6\underline{j} - 3\underline{k}$ and $\underline{b} = 4\underline{i} + 3\underline{j} - \underline{k}$ Also find Sine of the angle between them.	(5)

Mathematics | D | L.K.No - 919 | Paper Code No. 8197

Paper II (Objective Type) | Inter - A- 2018

Time Allowed : 30 Minutes | Inter (Part - II)

Maximum Marks : 20 | Session (2014 - 16) to (2016 - 18)

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 number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q. (1)

(1) If $x = at^2$ and $y = 2at$ are equations of a Curve then " t " is called :
(A) Variable (B) Constant (C) Parameter (D) Coefficient

(2) If $y = e^{ax}$, then y_4 is : (A) a^4e^{ax} (B) $\frac{2e^{ax}}{a}$ (C) $3e^{ax}$ (D) xe^{ax}

(3) $\frac{d}{dx}(-\text{Cot}x)$: (A) Sec^2x (B) Cosec^2x (C) $-\text{Cosec}^2x$ (D) $-\text{Sec}^2x$

(4) $x = a\,\text{Cost}$ and $y = a\,\text{Sint}$ are the Parametric Equations of a :
(A) Circle (B) Parabola (C) Ellipse (D) Line

(5) $\frac{d}{dx}(\sqrt{\text{Tanx}}) =$ (A) $\sqrt{\text{Sec}^2x}$ (B) $\frac{1}{2\sqrt{\text{Tanx}}}\text{Sec}^2x$ (C) $\frac{1}{2\sqrt{\text{Tanx}}}$ (D) $\frac{1}{2}(\text{Sec}^2x)^{-\frac{1}{2}}$

(6) Slope of Line $ax - by + c = 0$ is : (A) $\frac{a}{b}$ (B) $\frac{b}{a}$ (C) $\frac{-a}{b}$ (D) $\frac{-b}{a}$

(7) If two lines are Perpendicular, then : (A) $\frac{m_1}{m_2} = -1$ (B) $\frac{m_1}{m_2} = 1$ (C) $m_1m_2 = -1$ (D) $m_1m_2 = 1$

(8) Both Relative Maximum and Relative Minimum are called in General :
(A) Greatest Value (B) Least Value (C) Relative Extrema (D) Maxima

(9) The Coordinates of a point $P(x, y)$ translated through the point $Q'(h, k)$ then the coordinate of P referred to new axes are :
(A) $(x - h, y - k)$ (B) $(x + h, y + k)$ (C) $(x - k, y - h)$ (D) $(x + k, y + h)$

(10) The Centre of the Circle $x^2 + y^2 = r^2$ is : (A) (1,1) (B) (2,0) (C) (0,0) (D) (0,2)

(11) A function which is to be maximized or minimized is called :
(A) Subjective Function (B) Objective Function (C) Qualitative Function (D) Quantitative Function

(12) x intercept and y intercept for the line $2x - y + 4 = 0$ are :
(A) (2, -4) (B) (-2, -4) (C) (-2, 4) (D) (2, 4)

(13) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is the standard equation of : (A) Ellipse (B) Circle (C) Parabola (D) Hyperbola

(14) The Solution of the differential equation $\frac{dy}{dx} = -y$ is :
(A) $y = xe^{-x}$ (B) $y = ce^{-x}$ (C) $y = e^x$ (D) $y = ce^x$

(15) $\int_0^{\frac{\pi}{4}} \frac{\text{Sec}^2x}{1 + \text{tan}x}\,dx$ (A) 1 (B) 2 (C) ln2 (D) $\ln\sqrt{2}$

(16) The length of the Latusrectum of Parabola $y^2 = 4ax$ is : (A) 2a (B) 4a (C) 4ax (D) $\frac{y}{2a}$

(17) $\int\sqrt{2x+3}\,2\,dx =$
(A) $\frac{2}{3}(2x+3)^{\frac{3}{2}} + c$ (B) $\frac{3}{2}(2x+3)^{\frac{3}{2}}$ (C) $-\frac{2}{3}(2x+3)^{\frac{3}{2}}$ (D) $-\frac{3}{2}(2x+3)^{\frac{3}{2}}$

(18) Area of the Triangle with $\underline{u}$ and $\underline{v}$ its side is : (A) $\underline{u} \times \underline{v}$ (B) $\frac{1}{2}|\underline{u} \times \underline{v}|$ (C) $\underline{u} \cdot \underline{v}$ (D) $\underline{uv}$

(19) A Unit Vector perpendicular to both $\underline{u}$ and $\underline{v}$ is given by :
(A) $\underline{u} \times \underline{v}$ (B) $\underline{u} - \underline{v}$ (C) $\frac{\underline{u} \times \underline{v}}{|\underline{u} \times \underline{v}|}$ (D) $|\underline{u} \times \underline{v}|$

(20) $\int \frac{1}{x}\,dx =$ (A) $\frac{1}{x^2}$ (B) $\frac{-1}{x^2}$ (C) $\frac{1}{x}$ (D) $\ln x + c$

Roll No.	919- 20000	
Mathematics (Subjective)	Inter-A-2018	Inter Part - II
Time : 2 : 30 Hours	Session (2014 - 16) to (2016 -18)	Total Marks : 80

Note : It is compulsory to attempt (8 – 8) parts each from Q.No.2 and 3 while attempt any 9 parts from Q. No.4 . Attempt any (03) 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) Define Linear Function. (ii) $f(x) = x^2$ differentiate by First Principle.

(iii) Find Derivative of $y = (x^2 + 5)(x^3 + 7)$ (iv) Differentiate Sin x with respect to Cot x

(v) Find Extreme Values of $f(x) = x^2 - x - 2$ (vi) Expand a^x in Maclaurin Series.

(vii) Differentiate $(\ln x)^x$ w.r.t. x. (viii) Find y_2 if $y = \sqrt{x} + \frac{1}{\sqrt{x}}$

(ix) Evaluate the limit $\lim_{\Theta \to 0} \frac{1 - \cos\Theta}{\sin^2\Theta}$ (x) If $x = 1 - t^2$, $y = 3t^2 - 2t^3$ find $\frac{dy}{dx}$

(xi) Find $\frac{dy}{dx}$ if $y = \ln(x + \sqrt{x^2 + 1})$

(xii) Without finding $f^{-1}(x)$ state Domain and Range of $f^{-1}(x)$ if $f(x) = \sqrt{x + 2}$

Q.No.3 (i) Define the Convex Region. (ii) Use differential to approximate the value of $\sqrt{17}$

(iii) Graph the solution set of $2x + 1 \geq 0$. (iv) Solve the differential equation $xdy + y(x-1)dx = 0$

(v) Evaluate $\int x e^x dx$ (vi) Evaluate $\int x \tan^{-1} x \, dx$

(vii) Evaluate $\int_0^3 \frac{dx}{x^2 + 9}$ (viii) Evaluate $\int \frac{\cos 2x - 1}{1 + \cos 2x} dx$

(ix) Evaluate $\int \frac{1}{x \ln x} dx$ (x) Evaluate $\int \frac{x + 2}{\sqrt{x + 3}} dx$

(xi) Evaluate $\int \frac{(1 - \sqrt{x})^2}{\sqrt{x}} dx$ (xii) Evaluate $\int \frac{e^{m \tan^{-1} x}}{1 + x^2} dx$

Q.No.4 (i) Find the Coordinates of the point that divides the join of A(-6,3), B(5,-2) in the ratio 2 : 3

(ii) Find the Area of Triangle with vertices A(1,4), B(2,-3) and C(3,-10)

(iii) Check whether the given point (-7,6) lies above or below the given line $4x + 3y - 9 = 0$

(iv) Determine the value of " P " such that the lines $2x - 3y - 1 = 0$, $3x - y - 5 = 0$ and $3x + py + 8 = 0$ meet at a point.

(v) Find Foci of Ellipse whose equation is $x^2 + 4y^2 = 16$

(vi) Find " α " so that $|\alpha \underline{i} + (\alpha + 1)\underline{j} + 2\underline{k}| = 3$

(vii) If $\underline{v}$ is a vector for which $\underline{v} \cdot \underline{i} = 0$, $\underline{v} \cdot \underline{j} = 0$, $\underline{v} \cdot \underline{k} = 0$ find $\underline{v}$

(viii) Prove that $\underline{a} \times (\underline{b} + \underline{c}) + \underline{b} \times (\underline{c} + \underline{a}) + \underline{c} \times (\underline{a} + \underline{b}) = 0$

(ix) A force $\vec{F} = 7\underline{i} + 4\underline{j} - 3\underline{k}$ is applied at P(1,-2,3). Find its Moment about the point Q(2,1,1)

(x) Define Rotation of Axes.

(xi) Define Vertex of Parabola.

(xii) Find Focus of Parabola $y^2 = -12x$.

(xiii) Define Latusrectum of Ellipse.

L.K.No. 919 | Part - II

Q.No.5 (a) Prove that $\lim_{x \to 0} \frac{a^x - 1}{x} = \log_e a$ (5)

(b) Differentiate from the Ist Principle $f(x) = \cos\sqrt{x}$ (5)

Q.No.6 (a) Show that $\int \sqrt{a^2 - x^2}\, dx = \frac{a^2}{2} \sin^{-1}\frac{x}{a} + \frac{x}{2}\sqrt{a^2 - x^2} + c$ (5)

(b) Find " h " such that the points $A(\sqrt{3}, -1)$, $B(0,2)$ and $C(h,-2)$ are vertices of a right triangle with right angle at the vertex " A ". (5)

Q.No.7 (a) Evaluate $\int_0^{\frac{\pi}{4}} \frac{\cos\theta + \sin\theta}{2\cos^2\theta}\, d\theta$ (5)

(b) Minimize $z = 3x + y$

Subject to the Constraints

$3x + 5y \geq 15$

$x + 6y \geq 9$

$x \geq 0 \; ; \; y \geq 0$ (5)

Q.No.8 (a) Find the Focus, Vertex and Directrix of the Parabola $y^2 = -8(x - 3)$ (5)

(b) By Vector Method, prove that in any triangle

$$\frac{a}{\sin\alpha} = \frac{b}{\sin\beta} = \frac{c}{\sin\gamma}$$ (5)

Q.No.9 (a) Find the Centre, Foci, Eccentricity, Vertices and Equations of Directrices of Hyperbola $x^2 - y^2 = 9$ (5)

(b) Find Volume of Tetrahedron with vertices

$A(0,1,2)$, $B(3,2,1)$, $C(1,2,1)$, $D(5,5,6)$ (5)