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		

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.

BwP-22

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^{2}ax (B) aCosec^{2}ax (C) – aCosec^{2}ax (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 Supp-22 — 25 x 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 $Cos29^o$.			
	(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)

13-06-2022