SENDHIL MATRIC. HR.SEC. SCHOOL

ADHIYAMANKOTTAI-DHARMAPURI

HIGHER SECONDARY SECOND YEAR - MATHEMATICS PUBLIC ANSWER KEY-MARCH 2025

TYPE A				TYPE B			
Q.No.	OPT	ANSWER	MARK	Q.No.	OPT	ANSWER	MARK
1	a	N	1	1	b	$\frac{1}{\sqrt{2}}$	1
2	d	2	1	2	a	π	1
3	d	$\frac{1}{5}$	1	3	d	$2xu$	1
4	d	2.5	1	4	a	N	1
5	a	1,2	1	5	d	$\frac{1}{5}$	1
6	a	19	1	6	a	(1,0)	1
7	b	$y = x^3 + 2$	1	7	d	2.5	1
8	b	[1,2]	1	8	b	$\frac{1}{f(x)}f'(x)\,dx$	1
9	d	$2xu$	1	9	b	[1,2]	1
10	b	2	1	10	d	2	1
11	b	$\pm\frac{1}{\sqrt{2}}(1+i)$	1	11	c	$\frac{\pi a^3}{6}$	1
12	b	$1+i$	1	12	a	1,2	1
13	d	0.25	1	13	b	$\frac{\pi}{6}$	1
14	c	$\frac{\pi}{2}$	1	14	a	19	1
15	a	(1,0)	1	15	b	$1+i$	1
16	b	$\frac{\pi}{6}$	1	16	c	$\frac{\pi}{2}$	1
17	c	$\frac{\pi a^3}{6}$	1	17	b	$\pm\frac{1}{\sqrt{2}}(1+i)$	1
18	b	$\frac{1}{\sqrt{2}}$	1	18	b	$y = x^3 + 2$	1
19	a	π	1	19	d	2.5	1
20	b	$\frac{1}{f(x)}f'(x)\,dx$	1	20	d	2	1

PART - II

Q.No.	ANSWER	MARK
21	$\lvert adj\ A\rvert = 9$	1
	$A^{-1} = \pm\frac{1}{\sqrt{\lvert adj\ A\rvert}}(adj\ A) = \pm\frac{1}{3}\begin{bmatrix}-1 & 2 & 2\\ 1 & 1 & 2\\ 2 & 2 & 1\end{bmatrix}$	1
22	$Re\left(\frac{1}{z}\right) = Re\left(\frac{1}{x+iy}\right) = Re\left(\frac{x-iy}{x^2+y^2}\right)$	1
	$\frac{x}{x^2+y^2}$	1
23	$tan^{-1}(-\sqrt{3}) = -\frac{\pi}{3} \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$	2
24	$m = 4, a^2 = 9$	1
	$c^2 = a^2(1+m^2) = 9 \times 17$	
	$c = \pm 3\sqrt{17}$	1
25	The slant asymptote is $y = x - 11$	2
26	$F(tx, ty) = t^1F(x, y)$	1
	F is a homogeneous function and degree is 1.	1
27	$\int\frac{dy}{\sqrt{1-y^2}} = \int\frac{dx}{\sqrt{1-x^2}}$	1
	$sin^{-1}y = sin^{-1}x + sin^{-1}c$	1

28	$\int_{-\infty}^{\infty} f(x)dx = 1$ $f(x) = \begin{cases} \frac{x^2}{21}, & 1 < x < 4 \\ 0, & Otherwise \end{cases}$	1 1
29	The roots are $-2 \pm i$ Polynomial root is $x^2 + 4x + 5$	1 1
30	$\int_0^{2a} f(x)dx = 2\int_0^a f(x)\,dx$ $f(2a - x) = f[\sin(\pi - x)] = f[\sin x] = f(x)$ $\int_0^{\pi} f(x)dx = 2\int_0^{\frac{\pi}{2}} f(x)\,dx$	1 1

PART - III

Q.No.	ANSWER	MARK
31	$\lvert A\rvert = 1 \neq 0$ $adj\ A = \begin{bmatrix} -2 & 5 \\ 1 & -2 \end{bmatrix}$ $X = BA^{-1} = B\left\{\frac{1}{\lvert A\rvert} adj\ A\right\} = \begin{bmatrix} -11 \\ 4 \end{bmatrix}$	1 1 1
32	$\lvert Z_0\rvert = \sqrt{100} = 10$ $\lvert\lvert Z\rvert - \lvert Z_0\rvert\rvert \leq \lvert Z + Z_0\rvert \leq \lvert\lvert Z\rvert + \lvert Z_0\rvert\rvert$ $8 \leq \lvert Z + 6 + 8i\rvert \leq 12$	1 1 1
33	Co-efficient of even and odd power equal ,$x = -1$ $7x^2 - 50x + 7 = 0$ The solution is $-1, 7$ and $\frac{1}{7}$	1 1 1
34	$tan^{-1}x + tan^{-1}y = tan^{-1}\left[\frac{x+y}{1-xy}\right]$ $tan^{-1}\left(\frac{2}{11}\right) + tan^{-1}\left(\frac{7}{24}\right) = tan^{-1}\left[\frac{1}{2}\right]$	1 2
35	$[\vec{a}+\vec{c} \quad \vec{a}+\vec{b} \quad \vec{a}+\vec{b}+\vec{c}] = [\vec{a}, \vec{b}, \vec{c}] \begin{vmatrix} 1 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{vmatrix}$ $[\vec{a}+\vec{c} \quad \vec{a}+\vec{b} \quad \vec{a}+\vec{b}+\vec{c}] = [\vec{a}, \vec{b}, \vec{c}]$	2 1
36	$\frac{du}{dt} = \frac{\partial u}{\partial x} \times \frac{dx}{dt} + \frac{\partial u}{\partial y} \times \frac{dy}{dt}$ $\frac{du}{dt} = (2xy + 3y^4)(e^t) + (x^2 + 12xy^3)(\cos t)$ $\frac{du}{dt} = (2e^t \sin t + 3sin^4 t)(e^t) + (e^{2t} + 12e^t sin^3 t)(\cos t)$	1 1 1
37	$\int_0^{\frac{\pi}{2}} \frac{dx}{1+5cos^2 x} = \int_0^{\frac{\pi}{2}} \frac{sec^2 x\, dx}{sec^2 x+5}$ $= \int_0^{\frac{\pi}{2}} \frac{sec^2 x\, dx}{tan^2 x+6}$ $= \int_0^{\infty} \frac{dt}{t^2+6}$ $\int_0^{\frac{\pi}{2}} \frac{dx}{1+5cos^2 x} = \frac{\pi}{2\sqrt{6}}$	1 1 1
38	$E(X) = \frac{(1 \times 200) + (4 \times 100) + (6 \times 50) - (2 \times 600)}{600}$ $E(X) = -\frac{300}{600} = -0.5$	1 2

39	| Derivatives | $X = 2$ | | $f(x) = x^3 + 2x + 1$ | $f(2) = 8 + 4 + 1 = 13$ | | $f'(x) = 3x^2 + 2$ | $f'(2) = 12 + 2 = 14$ | | $f''(x) = 6x$ | $f''(2) = 12$ | | $f'''(x) = 6$ | $f'''(2) = 6$ | $f(x) = f(x) + (x-a)\frac{f'(x-a)}{1!} + (x-a)^2\frac{f''(x-a)}{2!} + (x-a)^3\frac{f'''(x-a)}{3!} + \cdots$ $f(x) = 13 + (x-2)14 + (x-2)^2\frac{12}{2} + (x-2)^3\frac{6}{6}$ $f(x) = 13 + 14(x-2) + 6(x-2)^2 + (x-2)^3$	1 1 1
40	$a * b = a + b - ab + 7$ $\left(\frac{3}{2}\right) * m = \frac{87}{10}$ $\frac{3}{2} + m - \frac{3m}{2} + 7 = \frac{87}{10}$ $m = -\frac{2}{5}$	1 1 1
	PART - IV	
Q.No.	**ANSWER**	**MARK**
41.A	$\Delta = 6 \neq 0$ $\Delta_1 = 12, \Delta_2 = -6, \Delta_3 = 24$ $(x_1, x_2, x_3) = (2, -1, 4)$	1 3 1
41.B	$m = -\frac{2\cos t}{7\sin t}$ Equation of tangent: $2x\cos t + 7y\sin t = 14$ Equation of normal: $7x\sin t - 2y\cos t = 45\sin t\cos t$.	1 2 2
42.A	$(Z-1)^3 + 8 = 0$ $Z = 1 - 2(cis\ 0)^{\frac{1}{3}}$ $Z = 1 - 2\left[cis\left(\frac{2k\pi}{3}\right)\right]$, where $k = 0,1,2$ The roots are $-1, 1 - 2\omega$ and $1 - 2\omega^2$.	1 1 2 1
42.B	The curve intersecting at $y = -1$ & 2. $\int_{-1}^{2}(2 + y - y^2)\,dy = \frac{9}{2}$ Diagram	2 2 1
43.A	$6\left[x^2 + \frac{1}{x^2}\right] - 5\left[x + \frac{1}{x}\right] - 38 = 0$ $6y^2 - 5y - 50 = 0$ $y - \frac{10}{3} = 0$ & $y + \frac{5}{2} = 0$ The solution are $3, \frac{1}{3}, -2$ and $-\frac{1}{2}$.	1 1 2 1
43.B	$\frac{dy}{dx} + \frac{x^2 - 3y^2}{2xy} = 0$ $v + x\frac{dv}{dx} + \frac{1 - 3v^2}{2v} = 0$ $\int \frac{2v}{v^2 - 1}\,dv - \int \frac{dx}{x} = 0$ $\log\lvert v^2 - 1\rvert - \log\lvert x\rvert = \log C$ $y^2 - x^2 = kx^3$	1 1 1 1 1
44.A	Equation of parabola : $x^2 = -4ay$ $4a = \frac{225}{10}$ At $(6, -y_1)$ $y_1 = 1.6$ Required height $= 10 - 1.6 = 8.4$	1 1 2 1
44.B	$\vec{a} = \cos\alpha\,\hat{\imath} + \sin\alpha\,\hat{\jmath}$, $\vec{b} = \cos\beta\,\hat{\imath} + \sin\beta\,\hat{\jmath}$ $\vec{a}\cdot\vec{b} = \cos(\alpha - \beta)$ $\vec{a}\cdot\vec{b} = \cos\alpha\cos\beta + \sin\alpha\sin\beta$ $\cos(\alpha - \beta) = \cos\alpha\cos\beta + \sin\alpha\sin\beta$	2 1 1 1

<table>
<tr><td>45.A</td><td>$p=\frac{8}{9}$ & $q=\frac{1}{9}, n=9$
$P(X=3)=9C_3\left(\frac{8}{9}\right)^3\left(\frac{1}{9}\right)^6$
$P(X=0)=9C_9\left(\frac{8}{9}\right)^9\left(\frac{1}{9}\right)^0$</td><td>3
1
1</td></tr>
<tr><td>45.B</td><td>Foci$(h\pm ae, k\pm 0)=(\pm 2,1)$
$(h,k)=(0,1)$ and $ae=2, a=4$ & $b^2=12$
Equation of ellipses: $\frac{x^2}{16}+\frac{(y-1)^2}{12}=1$</td><td>1
3
1</td></tr>
<tr><td>46.A</td><td>$\vec{a}=\hat{j}-5\hat{k},\quad \vec{b}=2\hat{i}+3\hat{j}+6\hat{k},\quad \vec{c}=\hat{i}+\hat{j}-\hat{k}$
Non-parametric form : $\vec{r}.\left(-9\hat{i}+8\hat{j}-\hat{k}\right)=0$
Cartesian form : $-9x+8y-z=13\ (or) 9x-8y+z+13=0$</td><td>3
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1</td></tr>
<tr><td>46.B</td><td>$A=Ce^{kt}$
<table><tr><td>t</td><td>0</td><td>50</td><td>$50\left(\frac{\log 3}{\log 2}\right)$</td></tr><tr><td>$A$</td><td>$A_0$</td><td>$2A_0$</td><td>$3A_0$</td></tr></table></td><td>2
3</td></tr>
<tr><td>47.A</td><td>Volume of the cylinder $v=\pi r^2 h$
$h=\frac{b}{a}(a-r)$ & $r=\frac{2a}{3}$
Volume of the cylinder= $\frac{4}{9}$ volume of the cone.
Diagram</td><td>1
2
1
1</td></tr>
<tr><td>47.B</td><td><table><tr><td>p</td><td>q</td><td>r</td><td>$q\vee r$</td><td>$p\wedge(q\vee r)$</td><td>$p\wedge q$</td><td>$p\wedge r$</td><td>$(p\wedge q)\vee(p\wedge r)$</td></tr>
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Mr. R. MURALI, M.Sc., B.Ed.,
DEPARTMENT OF MATHEMATICS