Register Number

Code: 20SC01T

I/II Semester Diploma Examination, Nov/Dec 2024

ENGINEERING MATHEMATICS

TIME: **3 HOURS** MAX MARKS: **100**

Note: i) Answer any 5 questions from SECTION-A, each question carries 4 marks.

ii) Answer any 10 questions from SECTION-B, each question carries 5 marks.

iii) Answer any 5 questions from SECTION-C, each question carries 6 marks.

SECTION – A

1. If $A = \begin{bmatrix} 4 & 5 \\ 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 6 \\ 1 & 3 \end{bmatrix}$, find the matrix A + 2B.

2. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, find $A - A^T$.

3. If the matrix $A = \begin{pmatrix} x & 1 \\ 3 & 4 \end{pmatrix}$ is singular then find 'x'.

4. Find the slope of the line whose angle of inclination is 45° with the positive x-axis.

5. Find the slope of the straight line passing through the points (2, 6) and (4, 9).

6. Convert 150° into radian and $\frac{3\pi}{2}$ into degree.

7. If $y = x^2 + 3\sin x + e^x + 1$ then find $\frac{dy}{dx}$

8. Find the slope of the tangent to the curve $y = x^3 + 1$ at (1, 2)

9. Integrate $x^2 + \frac{1}{x} + e^x + 2$ with respect to x.

10. Evaluate $\int_1^2 x\,dx$

SECTION – B

11. Verify whether AB = BA for the matrices $A = \begin{bmatrix} 3 & 7 \\ 4 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 7 & 3 \end{bmatrix}$.

12. Find adjoint of the matrix $A = \begin{bmatrix} 4 & 2 \\ 3 & 1 \end{bmatrix}$.

13. Find characteristic equation of the matrix $A = \begin{bmatrix} 3 & 2 \\ 4 & 5 \end{bmatrix}$.

14. Find equation of the straight line passing through the point (3,2) and having slope 5.

15. Find the equation of the straight line passing through the points (4,2) and (6,4).

16. Find the equation of straight line having x-intercept 2 and y-intercept 3 units respectively

17. Show that the two lines $2x + y - 4 = 0$ and $6x + 3y + 10 = 0$ are parallel.

18. Find the slope, x-intercept and y-intercept of the line $6x + 5y + 10 = 0$

19. Find the value of $\sin 150° + \cos 120°$.

20. Simplify:
$\sin(90° + \theta) + \cos(180° - \theta) + \tan(270° - \theta) + \cot(360° - \theta)$

21. Write the formula of $\sin(A + B)$ and hence find the value of $\sin 75°$

22. Prove that $\sin 2A = 2\sin A \cos A$ using compound angle formula.

23. If $y = x^2 + 3x + 7$, then find $\frac{d^2y}{dx^2}$

24. If $y = x \sin x$, then find $\frac{dy}{dx}$

25 If $y = \frac{1+x}{1-x}$, find $\frac{dy}{dx}$

26. Evaluate $\int (x^2(1 + x))dx$.

27. Evaluate $\int_0^1 (x^2 + 1)\, dx$.

28. Evaluate $\int x\, e^x\, dx$.

SECTION – C

29. Solve the equations $3x + 2y = 8$ and $4x + 5y = 6$ by applying Cramer's rule.

30. Identify the singular and non-singular matrices in the following matrices.
$A = \begin{bmatrix} 1 & 7 \\ 0 & 3 \end{bmatrix}$ $B = \begin{bmatrix} 3 & 1 \\ 9 & 3 \end{bmatrix}$ $C = \begin{bmatrix} 7 & 2 \\ 1 & 3 \end{bmatrix}$.

31. Find the equation of a line passing through the point (1, 3) and parallel to the line $5x + 2y + 10 = 0$.

32. Prove that $\sin 3A = 3\sin A - 4\sin^3 A$

33. Write the compound angle formula for $\tan(A+B)$ and hence prove that $\tan\left(\frac{\pi}{4} + A\right) = \frac{1 + \tan A}{1 - \tan A}$

34. Write product rule and hence find the derivative of $y = x^2 e^x \sin x$

35. If y is the distance travelled in meters by a particle in time x sec is given $x^3 + 5x^2 + 3x - 12$. Find the velocity and acceleration when $x = 1$ sec.

36. Find equation of tangent to the curve $y = x^2 + x$ at the point (1,2).

37. Find the area under the curve $y = 2x + 1$ with x-axis and ordinates $x = 0$ & $x = 2$

38. Find the volume of solid generated by revolving the curve $y^2 = 3x^2 - 1$ about the axis between $x = 1$ and $x = 3$.

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GOVERNMENT OF KARNATAKA

DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION

I/II SEMESTER DIPLOMA EXAMINATIONS, NOV-DEC-2024

Sub: Engineering Mathematics Code: 20SC01T

SCHEME AND MODEL ANSWER

Q.NO	SCHEME	MARK		Q.NO	SCHEME	MARK
	SECTION-A			20	Applying allied angle concept for each function Calculation and Solution	1+1+1+1 1
1	Finding 2B Writing matrix, A+2B Applying concept of addition of matrices Calculation and answer	1 1 1 1		21	Writing formula Writing given angle in compound angle Substituting in formula Writing standard angle value Calculation and Solution	1 1 1 1 1
2	Finding transpose of A Writing matrix, A-A^T Applying concept of addition of matrices Calculation and answer	1 1 1 1		22	Writing formula Substituting A=B Substituting in formula Simplification Arriving at result	1 1 1 1 1
3	Writing det(A)=0 Applying determinant definition Simplification Solution for x	1 1 1 1		23	Finding first derivative Finding second derivative	3 2
4	Writing given data Slope Formula Substitution Slope value	1 1 1 1		24	Identifying the rule Applying the product rule Writing the derivative of each	1 2 1+1
5	Writing given data Slope Formula Substitution Slope value	1 1 1 1		25	Identifying the rule Applying the quotient rule Writing the derivative of each	1 2 1+1
6	Multiplying by conversion factor for each Conversion value for each	1+1 1+1		26	Multiplying the term Integral of each Adding constant of integration	2 1+1 1
7	Derivative of each term	1+1+1+1		27	Integral of each term Applying limits Calculation and simplification Integral value	1+1 1 1 1

8	Finding derivative Substituting points Slope value	2 1 1		28	Identifying the rule Applying integration by part rule Simplification and solution	1 2 2
9	Integral of each term	1+1+1+1			**SECTION-C**	
10	Integral of each term Applying limits Calculation and solution	1+1 1 1		29	Finding Δ Finding Δ_1 and Δ_2 Finding x and y	2 2 2
	SECTION-B			30	Finding determinant of each matrix. Conclusion for each matrix	 1+1+1 1+1+1
11	Finding AB Finding BA Conclusion	2 2 1		31	Finding slope given of line Parallel condition Determining slope of parallel line Equation of line in one point form Substitution Simplification and solution	 1 1 1 1 1 1
12	Co-factor of each element Writing Adjoint	 1+1+1+1 1		32	Writing 3A=2A+A Formula for sin(A+B) Substituting in formula Substituting sin2A Substituting cos2A Simplification and proving	1 1 1 1 1 1
13	Characteristic definition Applying definition for A Applying determinant definition Calculation Solution	1 1 1 1 1		33	Formula for tan(A+B) Substituting in the formula on LHS Substituting in the formula on RHS Writing value of $\tan 45^0$ Proving LHS=RHS	2 1 1 1 1
14	Slope Formula Slope value Equation of straight line in one point form Substitution Calculation and Solution	1 1 1 1 1		34	For each term in applying product rule Each derivative	 1+1+1 1+1+1
15	Slope Formula Slope value Suitable equation of straight line in standard form Substitution	1 1 1		35	Finding first derivative Substituting x=1 in first derivative Finding velocity Finding second derivative	1 1 1 1

	Calculation and Solution	1 1			Substituting x=1 in second derivative Finding velocity	1 1
16	Equation of straight line in intercept form Substitution Calculation and Solution	2 1 2		36	Finding first derivative Substituting x=1 in first derivative Slope of tangent value Equation of tangent in standard form Substituting Simplification and solution	1 1 1 1 1 1
17	Finding slope of each line Conclusion	2+2 1		37	Area formula Substituting in formula Each integral Applying limit Calculation and solution	1 1 1+1 1 1
18	Writing value of a, b, c Finding slope Finding x-intercept Finding y-intercept	1 2 1 1		38	Volume formula Substituting in formula Each integral Applying limit Calculation and solution	1 1 1+1 1 1
19	Writing each angle in allied angle form Finding value of each Simplification and Solution	1+1 1+1 1				

MODEL ANSWER

Q. NO	SECTION-A
1	$Given\ A = \begin{bmatrix} 4 & 5 \\ 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 6 \\ 1 & 3 \end{bmatrix}$ $2B=\begin{bmatrix} 0 & 12 \\ 2 & 6 \end{bmatrix}$ $A+2B=\begin{bmatrix} 4 & 5 \\ 1 & 2 \end{bmatrix} + \begin{bmatrix} 0 & 12 \\ 2 & 6 \end{bmatrix}=\begin{bmatrix} 4+0 & 5+12 \\ 1+2 & 2+6 \end{bmatrix}=\begin{bmatrix} 4 & 17 \\ 3 & 8 \end{bmatrix}$
2	$Given\ A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ $A^T = \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$ $A - A^T = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} - \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix} = \begin{bmatrix} 1-1 & 2-3 \\ 3-2 & 4-4 \end{bmatrix}=\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$
3	$Given\ A = \begin{pmatrix} x & 1 \\ 3 & 4 \end{pmatrix}$ is singular If A is singular then det(A)=0 $\begin{vmatrix} x & 1 \\ 3 & 4 \end{vmatrix}=0 \Rightarrow 4x-3=0 \Rightarrow x=\frac{3}{4}$
4	Given $\theta=45^0$ Slope $m=\tan\theta \Rightarrow m=\tan 45^0=1$

5	Let $(x_1, y_1) = (2,6)$ and $B = (x_2, y_2) = (4,9)$ Slope $m = \frac{y_2 - y_1}{x_2 - x_1} \Longrightarrow m = \frac{9-6}{4-2} = \frac{3}{2}$
6	$x \text{ degree} = \frac{\pi}{180} \times x \text{ radians}$ $150° = \frac{\pi}{180} \times 150 \text{ radians}$ $150° = \frac{5\pi}{6} \text{ radians}$ $x \text{ radians} = \frac{180°}{\pi} \times x \text{ degree}$ $\frac{3\pi}{2} \text{ radians} = \frac{180°}{\pi} \times \frac{3\pi}{2} \text{ degree}$ $\frac{3\pi}{2} \text{radians} = 270 \text{ degree}$
7	$Given\ y = x^2 + 3\sin x + e^x + 1$ $\frac{dy}{dx} = 2x + 3cosx + e^x + 0$
8	$Given\ y = x^3 + 1$ $\frac{dy}{dx} = 3x^2 + 0$ Slope of tangent at (1,2) is m=$\frac{dy}{dx}$ at (1,2) $m = 3(1)^2 = 3$
9	$\int \left(x^2 + \frac{1}{x} + e^x + 2\right) dx = \frac{x^3}{3} + logx + e^x + 2x + c$
10	$\int_1^2 x\ dx = \left[\frac{x^2}{2}\right]_1^2 = \left[\frac{2^2}{2} - \frac{1^2}{2}\right]_1^2 = \frac{3}{2}$
	SECTION-B
11	Given $A = \begin{bmatrix} 3 & 7 \\ 4 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 7 & 3 \end{bmatrix}$ $AB = \begin{bmatrix} 3 & 7 \\ 4 & 0 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 7 & 3 \end{bmatrix} = \begin{bmatrix} 3X1 + 7X7 & 3X2 + 7X3 \\ 4X1 + 0X7 & 4X2 + 0X3 \end{bmatrix} = \begin{bmatrix} 52 & 27 \\ 4 & 8 \end{bmatrix}$ $BA = \begin{bmatrix} 1 & 2 \\ 7 & 3 \end{bmatrix} \begin{bmatrix} 3 & 7 \\ 4 & 0 \end{bmatrix} = \begin{bmatrix} 1X3 + 2X4 & 1X7 + 2X0 \\ 7X3 + 3X4 & 7X7 + 3X0 \end{bmatrix} = \begin{bmatrix} 11 & 7 \\ 33 & 49 \end{bmatrix}$ We observe that AB≠BA
12	Given $A = \begin{bmatrix} 4 & 2 \\ 3 & 1 \end{bmatrix}$ Cofactor of 4 = +1 Cofactor of 2 = -3 Cofactor of 3 = -2 Cofactor of 1 = +4 Adjoint of A= $adjA = \begin{bmatrix} 1 & -2 \\ -3 & 4 \end{bmatrix}$
13	Given $A = \begin{bmatrix} 3 & 2 \\ 4 & 5 \end{bmatrix}$ C.E is given by $\|A - \lambda I\| = 0$ $\left\| \begin{bmatrix} 3 & 2 \\ 4 & 5 \end{bmatrix} - \lambda \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \right\| = 0$ $\begin{vmatrix} 3-\lambda & 2 \\ 4 & 5-\lambda \end{vmatrix} = 0$ $(3-\lambda)(5-\lambda)$-4x2=0

	$\lambda^2 - 8\lambda + 7 = 0$
14	Given m=5 and $(x_1, y_1) = (3,2)$ Equation of straight line is $y - y_1 = m(x - x_1)$ $y - 2 = 5(x - 3)$ $-5x + y + 13 = 0$ or 5x-y-13=0 is the required equation of line.
15	Given: $(x_1, y_1) = (4,2)$ and $(x_2, y_2) = (6,4)$ Slope m=$\left(\frac{y_2-y_1}{x_2-x_1}\right)$=$\frac{4-2}{6-4} = 1$ Equation of straight line is $y - y_1 = \left(\frac{y_2 - y_1}{x_2 - x_1}\right)(x - x_1)$ $y - 2 = 1(x - 4)$ $-x + y - 2 + 4 = 0$ $-x + y + 2 = 0$ or x-y-2=0 is the required equation of the line.
16	Given that: $a = 2$ and $b = 3$ Equation of a straight line is $\frac{x}{a} + \frac{y}{b} = 1$ $\Longrightarrow \frac{x}{2} + \frac{y}{3} = 1$ $\Longrightarrow \frac{3x + 2y}{6} = 1 \quad \Longrightarrow 3x + 2y - 6 = 0$
17	Given lines $l1: 2x + y - 4 = 0$ and $l2: 6x + 3y + 10 = 0$ Let the slope of l_1 be $m_1 = -\frac{a}{b} = -\frac{2}{1} = -2$ Slope of $l2$ be $m_2 = -\frac{a}{b} = -\frac{6}{3} = -2$ We observe that $m_1 = m_2$, hence given two lines are parallel.
18	Given 6x+5y+10=0 a=6, b=5, c=10 Slope$== -\frac{a}{b} = -\frac{6}{5}$ x-intercept $== -\frac{10}{6} =-\frac{5}{3}$ y-intercept$== -\frac{10}{5}$ = -2
19	$sin\,150^0 = sin(180^0 - 30^0) = +sin\,30^0$=$+\frac{1}{2}$ $cos120^0 = \quad cos(180^0 - 60^0) = -cos60^0 = -\frac{1}{2}$ $Hence \quad sin\,150^0 + cos\,120^0 =\frac{1}{2} - \frac{1}{2}$=0
20	$sin(90^0 + \theta) + cos(180^0 - \theta) + tan(270^0 - \theta) + cot(360^0 - \theta)$ =$(+\,cos\theta) + (-\cos\theta)$ +$(+\,\cot\theta) + (-\cot\theta)$=0
21	We know that $\sin(A + B) = \sin A \cos B + \cos A \sin B \rightarrow (1)$ $\sin 75^o = \sin(45^o + 30^o)$ Substitute $A = 45^o, B = 30^o$ in equation (1), then we get $= \sin 45^o \cos 30^o + \cos 45^o \sin 30^o$

	$sin75^o = \frac{1}{\sqrt{2}} \times \frac{\sqrt{3}}{2} + \frac{1}{\sqrt{2}} \times \frac{1}{2} = \frac{\sqrt{3}+1}{2\sqrt{2}}$
22	We know that $\sin(A+B) = \sin A \cos B + \cos A \sin B \rightarrow (1)$ Put B=A in (1) then (1) becomes, $\sin(A+A) = \sin A \cos A + \cos A \sin A$ $\sin 2A = \sin A \cos A + \sin A \cos A$ $\sin 2A = 2\sin A\cos A$. Hence proved.
23	$Given\ y = x^2 + 3x + 7$ $\frac{dy}{dx} = 2x + 3(1) + 0$ $\frac{dy}{dx} = 2x + 3$ $\frac{d^2y}{dx^2} = 2(1) + 0 = 2$
24	$Given\ y = xsinx$ Apply product rule $\frac{dy}{dx} = x\frac{d(sinx)}{dx} + sinx\frac{d(x)}{dx}$=x(cosx)+sinx(1)=xcosx+sinx
25	Given $y = \frac{1+x}{1-x}$ Apply quotient rule $\frac{dy}{dx} = \frac{(1-x)\frac{d}{dx}(1+x) - (1+x)\frac{d}{dx}(1-x)}{(1-x)^2}$ $= \frac{(1-x)(0+1) - (1+x)(0-1)}{(1-x)^2}$ $= \frac{(1-x)(1) + (1+x)(1)}{(1-x)^2}$ $= \frac{2}{(1-x)^2}$
26	$\int(x^2(1+x))dx = \int(x^2+x^3)dx = \int(x^2)dx + \int(x^3)dx = \frac{x^3}{3} + \frac{x^4}{4}$+c
27	$\int_0^1 (x^2+1)\,dx = \left[\frac{x^3}{3} + x\right]_0^1 = \left[\frac{1^3}{3} + 1\right] - \left[\frac{0^3}{3} + 0\right] = \frac{4}{3}$
28	Let $I = \int x\,e^x\,dx$ Here x is Algebraic function and e^x is Exponential function. According to the ILATE rule of choosing the first function, u = I fn = x and v = II fn = e^x $\int(\text{I fn} \times \text{II fn})dx = \text{I fn}\int(\text{II fn})dx - \int(\int(\text{II fn})\,dx)\frac{d}{dx}(\text{I fn})\,dx$ $I = \int x\,e^x\,dx$ $= x\int e^x\,dx - \int(\int e^x\,dx)\frac{d}{dx}(x)\,dx$ $= x\,e^x - \int e^x \times 1dx$ $= x\,e^x - \int e^x\,dx$ $= x\,e^x - e^x + c$
29	Given $3x + 2y = 8$ $4x + 5y = 6$ let $\Delta = \begin{vmatrix} 3 & 2 \\ 4 & 5 \end{vmatrix} = 15 - 8 = 7$

	$\Delta_1 = \begin{vmatrix} 8 & 2 \\ 6 & 5 \end{vmatrix} = 40 - 12 = 28$ $\Delta_2 = \begin{vmatrix} 3 & 8 \\ 4 & 6 \end{vmatrix} = 18 - 32 = -14$ $\therefore x = \frac{\Delta_1}{\Delta} = \frac{28}{7} = 4$ and $y = \frac{\Delta_2}{\Delta} = \frac{-14}{7} = -2$
30	$Given\ A = \begin{bmatrix} 1 & 7 \\ 0 & 3 \end{bmatrix}$ then $\|A\| = \begin{vmatrix} 1 & 7 \\ 0 & 3 \end{vmatrix}$=1x3-7x0=3 $\|A\| \neq 0$ Hence A is non-singular. Given $B = \begin{bmatrix} 3 & 1 \\ 9 & 3 \end{bmatrix}$ then $\|B\| = \begin{vmatrix} 3 & 1 \\ 9 & 3 \end{vmatrix}$=3x3-1x9=0 $\|B\| = 0$ Hence B is singular. Given $C = \begin{bmatrix} 7 & 2 \\ 1 & 3 \end{bmatrix}$ then $\|C\| = \begin{vmatrix} 7 & 2 \\ 1 & 3 \end{vmatrix}$=7x3-2x1=19 $\|C\| \neq 0$ Hence C is non-singular.
31	$slope\ of\ given\ line\ \ 5x + 2y + 10 = 0$ $m_1 = -\frac{a}{b} = -\frac{5}{2}$ As the required line is parallel to given line $$m_1 = m_2 = -\frac{5}{2} = m$$ Equation of the required line passing through (1,3) is $y - y_1 = m(x - x_1)$ $y - 3 = -\frac{5}{2}(x - 1)$ $5x + 2y - 11 = 0$
32	$\sin 3A = \sin(2A + A)$ $\sin 3A = \sin 2A \cos A + \cos 2A \sin A$ $\sin 3A = (2 \sin A \cos A) \cos A + (1 - 2\sin^2 A) \sin A$ $\sin 3A = 2 \sin A \cos^2 A + \sin A - 2 \sin^3 A$ $\sin 3A = 2 \sin A (1 - \sin^2 A) + \sin A - 2 \sin^3 A$ $\sin 3A = 2 \sin A - 2 \sin^3 A + \sin A - 2 \sin^3 A$ $\sin 3A = 3 \sin A - 4 \sin^3 A$
33	$\tan(A + B) = \left(\frac{\tan A + \tan B}{1 - \tan A \tan B}\right)$ Put A=$\frac{\pi}{4}$ B=A in the above We get, $\tan\left(\frac{\pi}{4} + A\right) = \left(\frac{\tan\frac{\pi}{4} + \tan A}{1 - \tan\frac{\pi}{4}\tan A}\right)$ $\tan\left(\frac{\pi}{4} + A\right) = \left(\frac{1 + \tan A}{1 - 1.\tan A}\right)$ (as $\tan\frac{\pi}{4} = 1$) Hence $\tan\left(\frac{\pi}{4} + A\right) = \left(\frac{1 + \tan A}{1 - \tan A}\right)$
34	Given y= $x^2 e^x$ sinx $\frac{dy}{dx} = x^2 e^x \frac{d}{dx}(sinx) + e^x\, sinx \frac{d}{dx}(x^2) + x^2\, sinx \frac{d}{dx}(e^x)$ $\frac{dy}{dx} = x^2 e^x (\cos x) + e^x\, sinx\, (2x) + x^2\, sinx (e^x)$

35	Given $y = x^3 + 5x^2 + 3x - 12$ $\frac{\text{dy}}{\text{dx}} = 3x^2 + 5(2\text{x}) + 3(1) - 0$ $\frac{\text{dy}}{\text{dx}} = 3x^2 + 10\text{x} + 3$ $\frac{d^2y}{dx^2} = 3(2x) + 10(1)+0$ $\frac{d^2y}{dx^2} = 6x + 10$ Velocity at x=1 is $\frac{\text{dy}}{\text{dx}}$ at x=1, Velocity=$3(1)^2 + 10(1) + 3$=16 m/s Acceleration at x=1 is $\frac{d^2y}{dx^2}$ $at\ x = 1$ Acceleration=$6(1) + 10$=16 m/s^2
36	Given $y = x^2 + x$ $\frac{\text{dy}}{\text{dx}} = 2\text{x} + 1$ Slope of tangent at (1,2) is $\text{m} = \frac{\text{dy}}{\text{dx}}\ at\ (1,2)$ m=2(1)+1=3 Equation of tangent to the curve at the point (1,2) $\text{y}-\text{y}_1 = \text{m}(\text{x} - \text{x}_1)$ $\text{y}-2 = 3(\text{x} - 1)$ -3x+y+1=0 or 3x-y-1=0
37	We know that the area bounded by the curve y=f(x) between x=a and x=b about the x−axis is $A = \int_a^b y\ \text{dx} = \int_0^2 (2x + 1)\ \text{dx} = \left[2\frac{\text{x}^2}{2} + x\right]_0^2 = [\text{x}^2 + x]_0^2$=$(2^2 + 2)$- $(0^2 + 0)$ $\therefore$ A = 6 square units
38	We know that, the volume of the solid formed by revolving the curve y=f(x) and the x−axis between x=a and x=b about the x−axis is $\text{V} = \pi\int_a^b \text{y}^2\ \text{dx} = \pi\int_1^3 (3x^2 - 1)\text{dx} = \pi\left[3\frac{\text{x}^3}{3} - x\right]_1^3 = \pi[\text{x}^3 - x]_1^3$ $=\pi[(3^3 - 3) - (1^3 - 1)]$=24π cubic unit

Certified that the scheme of valuation and model answers prepared by me for the code 20SC01T are according to the revised syllabus and are correct.

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