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PRACTICE QUESTION PAPER - IV
CLASS XII - MATHEMATICS (041)

Time Allowed: 3 Hours

Maximum Marks: 80

General Instructions:

SECTION A (20 Marks)

This section comprises 20 questions of 1 mark each. Questions 1-18 are Multiple Choice Questions (MCQs) and questions 19-20 are Assertion-Reason based questions.

Multiple Choice Questions (MCQs)

1. Reflexive
 2. $[0, \infty)$
 3. 0
 4. 1
 5. 6
 6. $\begin{bmatrix} 0 & -a^3 \\ a^3 & 0 \end{bmatrix}$
 7. $\begin{bmatrix} 1 & 1 \\ 4 & 3 \end{bmatrix}$
 8. $|A|^{(n-1)^2}$
 9. 25
 10. 1
 11. $\frac{1}{\sqrt{x^2+a^2}}$
 12. $y = x^2$
 13. $\frac{\pi d}{2}$
 14. 5
 15. $\tan x - \cot x + C$
 16. Not defined
 17. $\left(\frac{12}{29}, -\frac{18}{29}, \frac{24}{29}\right)$
 18. 0
 19. (a)
 20. (d)
-

SECTION B (10 Marks)

This section comprises 5 questions of 2 marks each.

21. 0 (at $t = \frac{\pi}{2}$) OR 1 (at $t = \frac{\pi}{4}$)

22. $\frac{\sqrt{21}}{2}$

OR The lines intersect at $(1, 1, 2)$.

23. $\frac{\pi x}{2} - \frac{x^2}{2} + C$

OR $\sin^{-1}\left(\frac{x+3}{4}\right) + C$

24. $f(x) = \sin x$ is neither one-one nor onto.

25. $\frac{1}{3}$

SECTION C (18 Marks)

This section comprises 6 questions of 3 marks each.

26. $\frac{1}{2} \tan^{-1} x$

27. The function has no maximum value for $x > 0$. OR Minimum value = 16 OR $\frac{\cos x}{2x}$

28. $y = \sin x + C \cos x$

OR Verified true.

29. 7

OR $5x - 2y + 5z - 11 = 0$

30. $(1 - x^3)^2$

31. Minimum value $Z = 300$ at $(60, 0)$.

SECTION D (20 Marks)

This section comprises 4 questions of 5 marks each.

33. $\frac{16}{3}$ square units

OR $\frac{1}{6}$ square units

$$34. A^{-1} = \begin{bmatrix} -4 & 4 & 0 \\ 7 & -5 & 1 \\ -3 & 2 & -1 \end{bmatrix}, \quad x = -5, y = 8, z = 1$$

$$35. \text{Radius} = \frac{10}{\pi + 4} \text{ m, Height of rectangle} = \frac{20}{\pi + 4} \text{ m}$$

$$\text{OR } \frac{1}{2\sqrt{2}} \tan^{-1} \left(\frac{x}{\sqrt{2}} \right) - \frac{1}{4} \tan^{-1} \left(\frac{x}{2} \right) + C$$

$$36. \frac{3}{\sqrt{155}}$$

SECTION E (12 Marks)

This section comprises 3 case study based questions of 4 marks each.

$$37. (a) \vec{AB} = 3\hat{i} + 4\hat{j} + 9\hat{k}$$

(b) Yes, the points are collinear.

$$(c) \left(\frac{3}{\sqrt{106}}, \frac{4}{\sqrt{106}}, \frac{9}{\sqrt{106}} \right)$$

OR $\vec{0}$

$$38. (a) 500$$

(b)

X	$P(X)$
500	0.995
-9500	0.005

$$(c) E(X) = 450$$

$$\text{OR } Var(X) = 497500$$

$$39. (a) V = a^3$$

$$(b) 1500 \text{ cm}^3/\text{s}$$

$$\text{OR } k = 15$$