# SECOND REVISION TEST - 2025

**A**

## Standard XI

Reg.No. | | | | | | |

## MATHEMATICS

*Time : 3.00 hrs* **Part - A** *Marks : 90*

**20 x 1 = 20**

**I. Choose the correct answer:**

1. Let A and B be subsets of the universal set N, the set of natural numbers. Then $A' \cup [(A \cap B) \cup B']$ is
   a) A b) A′ c) B d) N
2. Let X = {1,2,3,4}, Y = {a,b,c,d} and f = {(1,a), (4,b), (2,c), (3,d), (2,d)}. Then f is
   a) an one-to-one function b) an onto function
   c) a function which is not one-to-one d) not a function
3. The number of solutions of $x^2 + |x - 1| = 1$ is
   a) 1 b) 0 c) 2 d) 3
4. Which of the following is not true?
   a) $\sin\theta = \frac{-3}{4}$ b) $\cos\theta = -1$ c) $\tan\theta = 25$ d) $\sec\theta = \frac{1}{4}$
5. $\frac{\cos 6x + 6\cos 4x + 15\cos 2x + 10}{\cos 5x + 5\cos 3x + 10\cos x}$ is equal to
   a) cos 2x b) cos x c) cos 3x d) 2 cos x
6. The number of 5 digit numbers all digits of which are odd is
   a) 25 b) $5^5$ c) $5^6$ d) 625
7. The value of 2 + 4 + 6 + ..... + 2n is
   a) $\frac{n(n-1)}{2}$ b) $\frac{n(n+1)}{2}$ c) $\frac{2n(2n+1)}{2}$ d) n(n+1)
8. The value of $\frac{1}{2!} + \frac{1}{4!} + \frac{1}{6!} + \ldots\ldots$ is
   a) $\frac{e^2+1}{2e}$ b) $\frac{(e+1)^2}{2e}$ c) $\frac{(e-1)^2}{2e}$ d) $\frac{e^2-1}{2e}$
9. The slope of the line which makes an angle 45° with the line 3x – y = –5 are
   a) 1, –1 b) $\frac{1}{2}, -2$ c) $1, \frac{1}{2}$ d) $2, -\frac{1}{2}$
10. The image of the point (2,3) in the line y = –x is
    a) (–3,–2) b) (–3,2) c) (–2,–3) d) (3,2)
11. If $A = \begin{bmatrix} \lambda & 1 \\ -1 & -\lambda \end{bmatrix}$, then for what value of λ, $A^2 = 0$?
    a) 0 b) ±1 c) –1 d) 1
12. The matrix A satisfying the equation $\begin{bmatrix} 1 & 3 \\ 0 & 1 \end{bmatrix} A = \begin{bmatrix} 1 & 1 \\ 0 & -1 \end{bmatrix}$ is
    a) $\begin{bmatrix} 1 & 4 \\ -1 & 0 \end{bmatrix}$ b) $\begin{bmatrix} 1 & -4 \\ 1 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 4 \\ 0 & -1 \end{bmatrix}$ d) $\begin{bmatrix} 1 & -4 \\ 1 & 1 \end{bmatrix}$

13. A vector makes equal angle with the positive direction of the coordinate axes. Then each angle is equal to

a) $\cos^{-1}\left(\frac{1}{3}\right)$ b) $\cos^{-1}\left(\frac{2}{3}\right)$ c) $\cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$ d) $\cos^{-1}\left(\frac{2}{\sqrt{3}}\right)$

14. $\lim_{x\to\infty} \frac{\sin x}{x} =$

a) 1 b) 0 c) $\infty$ d) $-\infty$

15. If $y = \sin^{-1}x$, then $\frac{dy}{dx} =$

a) $\frac{1}{\sqrt{1-x^2}}$ b) $\frac{-1}{\sqrt{1-x^2}}$ c) $\frac{1}{\sqrt{x^2-1}}$ d) $\frac{-1}{\sqrt{x^2-1}}$

16. If $x = a\sin\theta$, $y = b\cos\theta$, then $\frac{d^2y}{dx^2}$ is

a) $\frac{a}{b^2}\sec^2\theta$ b) $\frac{-b}{a}\sec^2\theta$ c) $\frac{-b}{a^2}\sec^3\theta$ d) $\frac{-b^2}{a^2}\sec^3\theta$

17. $\int \operatorname{cosec} x\, dx$

a) $\log|\operatorname{cosec} x + \cot x| + c$ b) $\log|\operatorname{cosec} x - \cot x| + c$
c) $\cot x + c$ d) $\sin x + c$

18. $\int \frac{dx}{e^x - 1}$ is

a) $\log|e^x| - \log|e^x - 1| + c$ b) $\log|e^x| + \log|e^x - 1| + c$
c) $\log|e^x - 1| - \log|e^x| + c$ d) $\log|e^x + 1| - \log|e^x| + c$

19. If two events A and B are independent such that P(A) = 0.35 and P(A∪B) = 0.6, then P(B) is

a) $\frac{5}{13}$ b) $\frac{1}{13}$ c) $\frac{4}{13}$ d) $\frac{7}{13}$

20. Ten coins are tossed. The probability of getting atleast 8 heads is

a) $\frac{7}{64}$ b) $\frac{7}{32}$ c) $\frac{7}{16}$ d) $\frac{7}{128}$

## Part - B

**II. Answer any 7 questions. (Q.No.30 is compulsory)** **7 x 2 = 14**

21. Graph the function $y = |x - 1|$
22. Solve : $|x - 9| < 2$
23. Find the value of $\frac{12!}{9! \times 3!}$
24. Find the slope of the straight line passing through the points (5,7) and (7,5). Also find the angle of inclination of the line with the x-axis.

25. Find $|A|$ if $A = \begin{bmatrix} 0 & \sin\alpha & \cos\alpha \\ \sin\alpha & 0 & \sin\beta \\ \cos\alpha & -\sin\beta & 0 \end{bmatrix}$

26. Find the area of the parallelogram whose adjacent sides are $\vec{a} = 3\hat{i} + \hat{j} + 4\hat{k}$ and $\vec{b} = \hat{i} - \hat{j} + \hat{k}$

27. Find the derivative of $y = \cos x - 2\tan x$ with respect to x.

28. Evaluate : $\int \frac{2x+4}{x^2+4x+6}\,dx$

29. If $P(A) = 0.52$, $P(B) = 0.43$ and $P(A \cap B) = 0.24$, then find $P(A \cap \bar{B})$

30. Express the angle $150^\circ$ in radian measure.

## Part - C

**III. Answer any 7 questions. (Q.No.40 is compulsory)** 7 x 3 = 21

31. $A = \{1,2,3,4\}$ and $B = \{3,4,5,6\}$, find $n((A \cup B) \times (A \cap B) \times (A \Delta B))$

32. Solve : $(2x + 1)^2 - (3x + 2)^2 = 0$

33. Simplify $\frac{\sin 75^\circ - \sin 15^\circ}{\cos 75^\circ + \cos 15^\circ}$

34. Find the rank of the word "GARDEN"

35. Find the distance between two parallel lines $3x + 4y = 12$ and $6x + 8y + 1 = 0$

36. If (k, 2), (2, 4) and (3, 2) are vertices of the triangle of area 4 square units then determine the value of k.

37. Let A, B and C be the vertices of a triangle. Let D, E and F be the mid points of the sides BC, CA and AB respectively. Show that $\overrightarrow{AD} + \overrightarrow{BE} + \overrightarrow{CF} = \vec{0}$

38. Find $\frac{dy}{dx}$ if $x = a(t - \sin t)$, $y = a(1 - \cos t)$

39. Integrate $e^x(\tan x + \log \sec x)$

40. If A and B are independent events such that $P(A) = 0.4$ and $P(A \cup B) = 0.9$. Find $P(B)$

## Part - D

**IV. Answer all the questions.** 7 x 5 = 35

41. a) If $f : R \to R$ is defined by $f(x) = 2x - 3$, prove that f is a bijection and find its inverse.

*(OR)*

b) A firm manufactures PVC pipes in three plants viz X, Y and Z. The daily production volumes from the three firms X, Y and Z are respectively 2000 units, 3000 units and 5000 units. It is known from the past experience that 3% of the output from plant X, 4% from plant Y and 2% from plant Z are defective. A pipe is selected at random from a day's total production.

i) Find the probability that the selected pipe is defective one

ii) If the selected pipe is a defective, then what is the probability that it was produced by plant Y?

42. a) Solve : $\frac{x+1}{x+3} < 3$

*(OR)*

b) Find the value of sin 18°

43. a) If A + B + C = 180°, prove that sin 2A + sin 2B + sin 2C = 4 sin A sin B sin C

*(OR)*

b) By the principle of Mathematical induction, prove that for $n \geq 1$

$$1.2 + 2.3 + 3.4 + \ldots\ldots + n.(n+1) = \frac{n(n+1)(n+2)}{3}$$

44. a) Find $\sqrt[3]{65}$

*(OR)*

b) Integrate $9x\, e^{3x}$

45. a) For what value of k does the equation $12x^2 + 2kxy + 2y^2 + 11x - 5y + 2 = 0$ represent two straight lines.

*(OR)*

b) Show that $\begin{vmatrix} x & a & a \\ a & x & a \\ a & a & x \end{vmatrix} = (x-a)^2(x+2a)$ by using factor theorem.

46. a) Prove that the medians of a triangle are concurrent.

*(OR)*

b) Find the constant b that makes g continuous on $(-\infty, \infty)$

$$g(x) = \begin{cases} x^2 - b^2 & \text{if } x < 4 \\ bx + 20 & \text{if } x \geq 4 \end{cases}$$

47. a) If $y = \frac{\sin^{-1} x}{\sqrt{1-x^2}}$, show that $(1-x^2)y_2 - 3xy_1 - y = 0$

*(OR)*

b) Resolve into partial fraction : $\frac{2x}{(x^2+1)(x-1)}$

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