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Tirunelveli District

Reg.No. : [- | 1 | 1 | 7 | 5 | 2]

SECOND REVISION TEST – 2025

Standard 11

MATHEMATICS

Part - I

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Time: 3.00 hrs.   **Marks: 90**

I. Choose the correct answer: 20 x 1 = 20

1. For non empty set A and B, if $A \subset B$ then $(A \times B) \cap (B \times A)$ is equal to

   a) $A \cap B$ b) $A \times A$ c) $B \times B$ d) none of these

2. If a and b are the roots of the equation $x^2 - kx + 16 = 0$ and satisfy $a^2 + b^2 = 32$, then the value of k is

   a) 10   b) –8   c) –8, 8   d) 6

3. If $\tan\alpha$ and $\tan\beta$ are the roots of $x^2 + ax + b = 0$, then $\dfrac{\sin(\alpha + \beta)}{\sin\alpha \sin\beta}$ is equal to

   a) $\dfrac{b}{a}$ b) $\dfrac{a}{b}$ c) $-\dfrac{a}{b}$ d) $-\dfrac{b}{a}$

4. Number of sides of a polygon having 44 diagonals is _____.

   a) 4   b) 4 !   c) 11   d) 22

5. The sum up to n terms of the series $\sqrt{2} + \sqrt{8} + \sqrt{18} + \sqrt{32} + \dots$ is

   a) $\dfrac{n(n+1)}{2}$ b) $2n(n+1)$ c) $\dfrac{n(n+1)}{\sqrt{2}}$ d) 1

6. The slope of the line which makes an angle 45° with the line $3x - y = -5$ are

   a) $1, -1$ b) $\dfrac{1}{2}, -2$ c) $1, \dfrac{1}{2}$ d) $2, -\dfrac{1}{2}$

7. The value of the determinant of $A = \begin{bmatrix} 0 & a & -b \\ -a & 0 & c \\ b & -c & 0 \end{bmatrix}$ is

   a) $-2abc$ b) abc c) 0   d) $a^2 + b^2 + c^2$

8. If $|\vec{a}| = 13$, $|\vec{b}| = 5$ and $\vec{a}.\vec{b} = 60°$, then $|\vec{a} \times \vec{b}|$ is

   a) 15   b) 25   c) 45   d) 25

9. The value of $\displaystyle\lim_{x \to 0} \dfrac{\sin x}{\sqrt{x^2}}$ is   a) 1   b) –1   c) 0   d) limit does not exist

10. If $g(x) = (x^2 + 2x + 1) f(x)$ and $f(0) = 5$ and $\displaystyle\lim_{x \to 0} \dfrac{f(x) - 5}{x} = 4$ then $g'(0)$ is

    a) 20   b) 14   c) 18   d) 12

11. $\int x^2 e^{x/2} \, dx$ is

    a) $x^2 e^{x/2} - 4x e^{x/2} - 8 e^{x/2} + c$ b) $2x^2 e^{x/2} - 8x e^{x/2} - 16 e^{x/2} + c$

    c) $2x^2 e^{x/2} - 8x e^{x/2} + 16 e^{x/2} + c$ d) $x^2 \dfrac{e^{x/2}}{2} - \dfrac{x e^{x/2}}{4} + \dfrac{e^{x/2}}{8} + c$

12. In a certain college 4% of the boys and 1% of the girls are taller than 1.8 meter. Further 60% of the students are girls. If a student is selected at random and is taller than 1.8 meters/ then the probability that the student is a girl is

   a) $2/11$ b) $3/11$ c) $5/11$ d) $7/11$

13. If the function f:[-3, -3] → S defined by $f(x) = x^2$ is onto, then S is

   a) [-9, 9]   b) R   c) [-3, -3]   d) [0, 9]

14. The value of $\log_3 11 \log_{11} 13 \log_{13} 15 \log_{15} 27 \log_{27} 81$ is

   a) 1   b) 2   c) 3   -d) 4

15. In a ΔABC, if (i) $\sin\frac{A}{2}\sin\frac{B}{2}\sin\frac{C}{2} > 0$ (ii) $\sin A \sin B \sin C > 0$ then

   a) Both (i) and (ii) are true   b) Only (i) is true

   c) Only (ii) is true   d) Neither (i) nor (ii) is true

16. If $\bar{a}$ and $\bar{b}$ include an angle 120° and their magnitudes are 2 and $\sqrt{3}$, $\bar{a}.\bar{b}$ is equal to

   a) $-\frac{\sqrt{3}}{2}$ b) $\sqrt{3}$ c) $-\sqrt{3}$ d) 2

17. If $|\bar{a}+\bar{b}| = 60°$, $|\bar{a}-\bar{b}| = 40°$ and $|\bar{b}| = 46$ then $|\bar{a}|$ is

   a) 32   b) 42   c) 12   d) 22

18. If $x = at^2$, $y = 2at$, then $\frac{dy}{dx} =$

   a) -t   b) $1/t$ c) $-1/t$ d) t

19. $\int\left(\frac{x-1}{x+1}\right) dx =$

   a) $x + 2\log(x+1) + c$ b) $x - 2\log(x+1) + c$

   c) $\frac{1}{2}\left(\frac{x-1}{x+2}\right)^2 + c$ d) $\frac{(x-1)^2}{2}\log(x+1) + c$

20. The Principale value of $\sec\theta = -2$

   a) $\pi/3$ b) $-2\pi/3$ c) $-\pi/3$ d) $2\pi/3$

Part - II

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

21. Write {x ∈ N: x^2 < 121 and x isa prime } in roster form.

22. Solve : |2x - 17| = 3

23. Write the nth term of the following sequences: $\frac{1}{2}, \frac{3}{4}, \frac{5}{6}, \frac{7}{8}, \frac{9}{10}, \dots$

24. Show that the lines are 3x + 2y + 9 = 0 and 12x + 8y - 15 = 0 are parallel lines.

25. If the area of the triangle with vertices $(-3, 0)$, $(3, 0)$ and $(0, k)$ is 9 square units, find the values of k

26. Find the value of λ for which the vectors $\vec{a} = 3\hat{i} + 2\hat{j} + 9\hat{k}$ and $\vec{b} = \hat{i} + \lambda\hat{j} + 3\hat{k}$ are parallel.

27. Find the projection of the vector $\hat{i} + 3\hat{j} + 7\hat{k}$ on the vector $2\hat{i} + 6\hat{j} + 3\hat{k}$

28. Evaluate : $\lim\limits_{x \to 1} \dfrac{x^3 - 1}{x - 1}$

29. If $x = a(t - \sin t)$, $y = a(1 - \cos t)$, Find $\dfrac{dy}{dx}$

30. The odds that the event A occurs is 5 to 7, find $P(A)$

Part - III

III. Answer any 7 questions. (Q.No.40 is compulsory) $7 \times 3 = 21$

31. Find the domain of $f(x) = \dfrac{1}{1 - 2\cos x}$

32. Show that $\log\dfrac{a^2}{bc} + \log\dfrac{b^2}{ca} + \log\dfrac{c^2}{ab} = 0$

33. Find the value of $\csc(-1410°)$

34. If $nP_r = 720$ and $nC_r = 120$, then find the value of n, r.

35. Find the equations of a parallel line and a perpendicular line passing through the point $(1, 2)$ to the line $3x + 4y = 7$.

36. If $\begin{bmatrix} 0 & p & 3 \\ 2 & q^2 & -1 \\ r & 1 & 0 \end{bmatrix}$ is skew symmetric, find the values of p, q and r

37. If $A = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$, $B = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$, Verify that $|AB| = |A| \, |B|$

38. Find the angle between the two vectors $\hat{i} - \hat{j}$ and $\hat{j} - \hat{k}$

39. Differenciate $y = e^x \sin x$

40. Integrate $\dfrac{1}{6x - 7 - x^2}$

Part - IV

IV. Answer all the questions. $7 \times 5 = 35$.

41. a) Let f, g: $R \to R$ be defined as $f(x) = 2x - |x|$ and $g(x) = 2x + |x|$. Find fog.

(OR)

b) Prove that $\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc\left(1 + \dfrac{1}{a} + \dfrac{1}{b} + \dfrac{1}{c}\right)$

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42. a) By the principle of mathematical induction, prove that, for all integers $n \geq 1$,

$$1 + 2 + 3 + \ldots + n = \frac{n(n+1)}{2}$$

(OR)

   b) Evaluate : $\int \frac{3x + 5}{x^2 + 4x + 7} \, dx$

43. a) Prove that $\sqrt[3]{x^3 + 6} - \sqrt[3]{x^3 + 3}$ is approximately equal to $\frac{1}{x^2}$ when x is sufficiently large.

(OR)

   b) Theorem 8.3: The medians of a triangle are concurrent - Prove.

44. a) Show that the equation $4x^2 + 4xy + y^2 - 6x - 3y - 4 = 0$ represents a pair of parallel lines. Find the distance between them.

(OR)

   b) Show that the vectors $5\hat{i} + 6\hat{j} + 7\hat{k}$, $7\hat{i} - 8\hat{j} + 9\hat{k}$, $3\hat{i} + 20\hat{j} + 5\hat{k}$ are coplanar.

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

(OR)

   b) A construction company employs 2 executive engineers. Engineer-1 does the work for 60% of jobs of the company. Engineer-2 does the work for 40% of jobs of the company. It is known from the past experience that the probability of an error when engineer-1 does the work is 0.03, whereas the probability of an error in the work of engineer-2 is 0.04. Suppose a serious error occurs in the work, which engineer would you guess did the work?

46. a) If A+B+C = 180°, prove $\sin 2A + \sin 2B + \sin 2C = 4 \sin A \sin B \sin C$

(OR)

   b) Prove that $\begin{vmatrix} x+1 & 3 & 5 \\ 2 & x+2 & 5 \\ 2 & 3 & x+4 \end{vmatrix} = (x-1)^2 (x+9)$

47. a) Resolve into Partical Fraction : $\frac{x}{(x+3)(x-4)}$

(OR)

   b) Evaluate : $\lim_{x \to 0} \frac{\sqrt{x^2 + 1} - 1}{\sqrt{x^2 + 16} - 4}$

****** **WIN MATHS TUITION**
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