Dharmapuri - DT

FIRST REVISION EXAMINATION - 2025

CLASS: 11 **MATHEMATICS** **Reg.No**

Time : 3.00 Hours **MARKS : 90**

PART-A

Note: (i) All questions are compulsory. **20 x 1 = 20**

(ii) Each question carries one mark.

(iii) Choose the most suitable answer from the given four alternatives.

1. If $n(A) = 2$ and $n(B \cup C) = 3$, then $n[(A \times B) \cup (A \times C)]$ is
   1) 2^3 2) 3^2 3) 6 4) 5

2. The range of the function $\frac{1}{1 - 2\sin x}$ is
   1) $(-\infty, -1) \cup (\frac{1}{3}, \infty)$ 2) $(-1, \frac{1}{3})$ 3) $[-1, \frac{1}{3}]$ 4) $(-\infty, -1] \cup [\frac{1}{3}, \infty]$

3. The solution set of the following inequality $|x - 1| \geq |x - 3|$ is
   1) [0, 2] 2) [2, ∞) 3) (0, 2) 4) (−∞, 2)

4. 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
   1) 10 2) −8 3) −8, 8 4) 6

5. If $\tan 35^\circ = \lambda$, then $\frac{\tan 145^\circ - \tan 125^\circ}{1 + \tan 145^\circ \tan 125^\circ} =$
   1) $\frac{1 - \lambda^2}{\lambda}$ 2) $\frac{1 + \lambda^2}{\lambda}$ 3) $\frac{1 + \lambda^2}{2\lambda}$ 4) $\frac{1 - \lambda^2}{2\lambda}$

6. A wheel is spinning at 2 radians/second. How many seconds will it take to make 10 complete rotations?
   1) 10π seconds 2) 20π seconds 3) 5π seconds 4) 15π seconds

7. In ${}^{2n}C_3 : {}^{n}C_3 = 11 : 1$ then n is
   1) 5 2) 6 3) 11 4) 7

8. The value of the series $\frac{1}{2} + \frac{7}{4} + \frac{13}{8} + \frac{19}{16} + \ldots$ Is
   1) 14 2) 7 3) 4 4) 6

9. If the point (8, -5) lies on the locus $\frac{x^2}{16} - \frac{y^2}{25} = k$, then the value of k is
   1) 0 2) 1 3) 2 4) 3

10. The image of the point (2, 3) in the line $y = -x$ is
    1) (-3, -2) 2) (-3, 2) 3) (-2, -3) 4) (3, 2)

11. If $A = \begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}$, $B = \begin{bmatrix} x & 1 \\ y & -1 \end{bmatrix}$ and $(A+B)^2 = A^2 + B^2$, then the values of x and y are
    1) x= 4, y= 1 2) x= 1 , y= 4 3) x= 0, y= 4 4) x= 2, y= 4

12.If A= $\begin{vmatrix} -1 & 2 & 4 \\ 3 & 1 & 0 \\ -2 & 4 & 2 \end{vmatrix}$ and B = $\begin{vmatrix} -2 & 4 & 2 \\ 6 & 2 & 0 \\ -2 & 4 & 8 \end{vmatrix}$, then B is given by

1) B= 4A 2) B= – 4A 3) B= –A 4) B= 6A

13.The vectors $\vec{a} - \vec{b}$, $\vec{b} - \vec{c}$, $\vec{c} - \vec{a}$ are

1) parallel to each other 2) unit vectors

3) mutually perpendicular vectors 4) coplanar vectors

14.If $\lambda\hat{\imath} + 2\lambda\hat{\jmath} + 2\lambda\hat{k}$ is a unit vector , then the value of λ is

1) $\frac{1}{3}$ 2) $\frac{1}{4}$ 3) $\frac{1}{9}$ 4) $\frac{1}{2}$

15.$\lim_{x\to 0} \frac{6^x - 3^x - 2^x + 1^x}{x^2} =$

1) log 3 log 2 2) $3(\log 2)^2$ 3) log 3 4) 2 log 3

16.$x = \frac{1-t^2}{1+t^2}, y = \frac{2t}{1+t^2}$ then $\frac{dy}{dx}$ is

1) $-\frac{y}{x}$ 2) $\frac{y}{x}$ 3) $-\frac{x}{y}$ 4) $\frac{x}{y}$

17. $\int \frac{\sqrt{\tan x}}{\sin 2x} dx$ is

1) $\sqrt{\tan x} + c$ 2) $2\sqrt{\tan x} + c$ 3) $\frac{1}{2}\sqrt{\tan x} + c$ 4) $\frac{1}{4}\sqrt{\tan x} + c$

18. If $\int f(x)dx = g(x) + c$, then $\int f(x)g'(x)dx$

1) $\int (f(x))^2 dx$ 2) $\int f(x)g(x)\,dx$ 3) $\int f'(x)\,g(x)\,dx$ 4) $\int (g(x))^2\,dx$

19.If A and B are any two events, then the probability that exactly one of them occur is

1) $P(A \cup \overline{B}) + P(\overline{A} \cup B)$ 2) $P(A \cap \overline{B}) + P(\overline{A} \cap B)$

3) P(A) + P(B) –P(A∩B) 4) P(A) + P(B) +2P($A \cap$B)

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

1) $\frac{7}{64}$ 2) $\frac{7}{32}$ 3) $\frac{7}{16}$ 4) $\frac{7}{128}$

PART-B

II. Answer any 7 of the following questions. Question no: 30 is compulsory: 7 x 2 =14

21.If $A \times A$ has 16 elements, $S = \{(a,b) \in A \times A : a < b\}$; $(-1,2)$ and $(0,1)$ are two elements of S, then, find the remaining elements of S.

22. Find the value of (i) $\tan \frac{7\pi}{12}$. (ii) $\sin 105^\circ$

23.Prove that $\log \frac{a^2}{bc} + \log \frac{b^2}{ca} + \log \frac{c^2}{ab} = 0$.

24.Find the family of straight lines (i) Perpendicular (ii) Parallel to $3x + 4y - 12 = 0$.

25. If $A=\begin{bmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ a & b & -1\end{bmatrix}$, show that A^2 is a unit matrix.

26. Find a unit vector along the direction of the vector $5\hat{i}-3\hat{j}+4\hat{k}$.

27. For what value of α is the function $f(x)=\begin{cases}\frac{x^4-1}{x-1} & if\ x\neq 1\\ \alpha & if\ x=1\end{cases}$ continuous at $x=1$?

28. Evaluate : (i) ${}^{10}P_4$ (ii) ${}^{9}C_3$

29. Integrate : $\frac{\sin x}{\cos^2 x}$

30. Differentiate : $y=e^{\sin x^2}$

PART-C

III. Answer any 7 questions of the following. Question no: 40 is compulsory. **7 x 3 = 21**

31. Write the values of f at -4, 1, -2 if

$$f(x)=\begin{cases}-x+4 & if\ -\infty < x \le -3\\ x+4 & if\ -3 < x < -2\\ x^2-x & if\ -2 \le x < 1\\ x-x^2 & if\ 1 \le x < 7\\ 0 & , \quad otherwise\end{cases}$$

32. Simplify : $\frac{1}{3-\sqrt{8}}-\frac{1}{\sqrt{8}-\sqrt{7}}+\frac{1}{\sqrt{7}-\sqrt{6}}-\frac{1}{\sqrt{6}-\sqrt{5}}+\frac{1}{\sqrt{5}-2}$.

33. Prove that $(1+\tan 1°)(1+\tan 2°)(1+\tan 3°)\ldots(1+\tan 44°)$ is a multiple of 4.

34. A polygon has 90 diagonals. Find the number of its sides?

35. Find the sum of first n terms of series $6+66+666+6666+\ldots$

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

37. For any two vectors $\vec{a}$ and $\vec{b}$, prove that $\left|\vec{a}\times\vec{b}\right|^2+(\vec{a}.\vec{b})^2=\left|\vec{a}\right|^2\left|\vec{b}\right|^2$

38. Evaluate : $\lim_{x\to 0}\frac{2^x-3^x}{x}$

39. A die is rolled. If it shows an odd number, then find the probability of getting 5.

40. Evaluate : $\int\frac{\cot x}{\sqrt{\sin x}}dx$

PART- D

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

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

(OR)

(b) Prove that $\sqrt{\frac{1-x}{1+x}}$ is approximately equal to $1-x+\frac{x^2}{2}$ when x is very small.

42. **(a)** Resolve into partial fractions: $\frac{x+12}{(x+1)^2(x-2)}$.

(OR)

(b) The chances of A, B and C becoming manager of a certain company are 5 : 3 : 2. The probabilities that the office canteen will be improved if A, B, and C become managers are 0.4, 0.5 and 0.3 respectively. If the office canteen has been improved, what is the probability that B was appointed as the manager?

43.**(a)** Solve : $\sqrt{3}\sin\theta - \cos\theta = \sqrt{2}$.

(OR)

(b) Evaluate: $\lim_{x\to\infty}\left(\frac{x^2+2x+1}{x^2-4x+2}\right)^x$

44.**(a)** Express the equation $\sqrt{3}x + y + 4 = 0$ in the following equivalent form:

(i) Slope and Intercept form (ii) Intercept form (iii) Normal form .

(OR)

(b) Show that the points whose position vectors $4\hat{\imath} + 5\hat{\jmath} + \hat{k}, -\hat{\jmath} - \hat{k}, 3\hat{\imath} + 9\hat{\jmath} + 4\hat{k}$ and $-4\hat{\imath} + 4\hat{\jmath} + 4\hat{k}$ are coplanar.

45.**(a)** Find the value of k, if the equation $12x^2 + 7xy - 12y^2 - x + 7y + k = 0$. represents a pair of straight lines. Further, find whether these lines are parallel or intersecting,

(OR)

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

46.**(a)** Evaluate: $\int \frac{2x+1}{\sqrt{9+4x-x^2}}dx$

(OR)

(b) Show that $\begin{vmatrix} b+c & a-c & a-b \\ b-c & c+a & b-a \\ c-b & c-a & a+b \end{vmatrix} = 8abc.$

47. **(a)** Using the Mathematical induction, show that for any natural number n,

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

(OR)

(b) Solve : $\frac{x^2-16}{x^2-2x-15} \leq 0$

B.SUGADEV.M.Sc,BEd
PG-Teacher
PH:8148406242