Tsi11M

Tenkasi District

First Revision Examination - 2024

20-01-2024

Standard 11

MATHEMATICS

Time: 3.00 Hours Marks: 90

Part - I

I. Choose the best answer. **20x1=20**

1) The range of the function $f(x) = |[x]-x|$, $x \in R$ is
   a) [0, 1] b) [0, ∞) c) [0, 1) d) (0, 1)

2) The solution of $5x - 1 < 24$ and $5x + 1 > -24$ is
   a) (4, 5) b) (−5, −4) c) (−5, 5) d) (−5, 4)

3) If $\frac{kx}{(x+2)(x-1)} = \frac{2}{x+2} + \frac{1}{x-1}$ then the value of k is
   a) 1 b) 2 c) 3 d) 4

4) $\cos 1^\circ + \cos 2^\circ + \cos 3^\circ + \ldots . \cos 179^\circ =$
   a) 0 b) 1 c) −1 d) 89

5) If $\tan\alpha$ and $\tan\beta$ are roots of $x^2 + ax + b = 0$ then $\frac{\sin(\alpha+\beta)}{\sin\alpha \sin\beta}$ is equal to
   a) $\frac{b}{a}$ b) $\frac{a}{b}$ c) $\frac{-a}{b}$ d) $-\frac{b}{a}$

6) The number of rectangles that a chess board has
   a) 81 b) 9^9 c) 1296 d) 6561

7) If a, 8, b are in A.P, a, 4, b are in GP and if a, x, b are in H.P then X is
   a) 2 b) 1 c) 4 d) 16

8) Which of the following is correct
   a) AM ≥ GM ≥ HM b) AM ≥ HM ≥ GM c) GM ≥ HM ≥ AM d) GM ≥ AM ≥ HM

9) 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)

10) If two straight lines x + (2K − 7)y + 3 = 0 and 3kx + 9y − 5 = 0 are prependicular then the value of k is
   a) k= 3 b) $k = \frac{1}{3}$ c) $k = \frac{2}{3}$ d) $K = \frac{3}{2}$

11) Let A and B be two symmetric matrices of same order then which one of the following statement is not true?
   a) A + B is a symmetric matrix b) AB is a symmetric matrix
   c) $AB = (BA)^T$ d) $A^T B = AB^T$

12) If the projection of $5\vec{i} - \vec{j} - 3\vec{k}$ on the vector $\vec{i} + 3\vec{j} + \lambda\vec{k}$ is same as the projection of $\vec{i} + 3\vec{j} + \lambda\vec{k}$ on $5\vec{i} - \vec{j} - 3\vec{k}$ then λ is equal to
   a) ±4 b) ±3 c) ±5 d) ±1

13) A vector of magnitude 0 is called
   a) zero vector b) unit vector
   c) scalar vector d) perpendicular vector

14) $\lim_{x\to\infty} \frac{a^x - b^x}{x} =$

a) log (ab) b) $\log\left(\frac{a}{b}\right)$ c) $\log\left(\frac{b}{a}\right)$ d) $\frac{a}{b}$

15) If x= a sinθ and y = b cos θ 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) $-\frac{b^2}{a^2}\sec^3\theta$

16) The number of points in R in which the function f(x) = |x − 1| + |x − 3| + sin x is not differentiable, is

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

17) $\int \frac{\sec x}{\sqrt{\cos^2 x}} dx$ is

a) $\tan^{-1}(\sin x) + c$ b) $2\sin^{-1}(\tan x) + c$

c) $\tan^{-1}(\cos x) + c$ d) $\sin^{-1}(\tan x) + c$

18) $\int \frac{x+2}{\sqrt{x^2-1}} dx$ is

a) $\sqrt{x^2-1} - 2\log\left|x+\sqrt{x^2-1}\right| + c$ b) $\sin^{-1}x - 2\log\left|x+\sqrt{x^2-1}\right| + c$

b) $2\log\left|x+\sqrt{x^2-1}\right| - \sin^{-1}x + c$ d) $\sqrt{x^2-1} + 2\log\left|x+\sqrt{x^2-1}\right| + c$

19) If x and y be two events such that p(x/y) = $\frac{1}{2}$, p(y/x) = $\frac{1}{3}$ and P(x∩y) = $\frac{1}{6}$ then p(x∪y)is

a) $\frac{1}{3}$ b) $\frac{2}{5}$ c) $\frac{1}{6}$ d) $\frac{2}{3}$

20) It is given that the events A and B are such that p(A) = $\frac{1}{4}$, p(A/B)= $\frac{1}{2}$ and p(B/A) = $\frac{2}{3}$ then p(B) is

a) $\frac{1}{6}$ b) $\frac{1}{3}$ c) $\frac{2}{3}$ d) $\frac{1}{2}$

II. Answer any seven questions.Q.No 30 is compulsory. **7x2=14**

21) If f: $\mathbb{R} \to \mathbb{R}$ is defined as $f(x) = 2x^2 - 1$ find the pre images of 17, 4 and −2.

22) If α and β are the roots of the quadratic eqn. $x^2 + \sqrt{2}x + 3 = 0$ form a quadratic polynomial with zeros $\frac{1}{\alpha}, \frac{1}{\beta}$

23) Find the value of sin 18°

24) Evaluate 98^4

25) Find the equation of the lines passing through the points of intersection of lines 4x − y + 3 = 0 and 5x + 2y + 7 = 0 and perpendicular to x − 2y + 1 =0.

26) Let A, B and C be the vertices of a Δ. Let D, E and F be the mid points of the sides BC, CA and AB respectively. S.T $\overline{AD} + \overline{BE} + \overline{CF} = \overline{0}$

27) Differentiate : y = cos (tan x)

28) Evaluate : $\int \frac{1}{\sqrt{1-81x^2}} dx$

29) If p(A) = 0.5, p(B) = 0.8 and p(B/A) = 0.8 find p(A/B) and p(A $\cup$ B)

30) Determine 3B + 4C – D if B, C and D are given by

$$B = \begin{bmatrix} 2 & 3 & 0 \\ 1 & -1 & 5 \end{bmatrix}, \quad C = \begin{bmatrix} -1 & -2 & 3 \\ -1 & 0 & 2 \end{bmatrix}, \quad D = \begin{bmatrix} 0 & 4 & -1 \\ 5 & 6 & -5 \end{bmatrix}$$

III. Answer any seven questions.Q.No 40 is compulsory. **7x3=21**

31) From the curve y = x draw y = – x and Y = x + 1

32) Prove that $\log\frac{75}{16} - 2\log\frac{5}{9} + \log\frac{32}{243} = \log 2$

33) Solve : $\sqrt{3}\sin\theta - \cos\theta = \sqrt{2}$

34) If the letters of the word GARDEN are permuted in all possible ways and the strings thus formed are arranged in the dictionary order, then find the ranks of the word (i) GARDEN (ii) DANGER

35) If a, b, c are in G.P and $a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$, then P.T x,y,z are in A.P

36) The slope of one of the st.lines $ax^2 + 2hxy + by^2 = 0$ is twice that of the other. S.T $8h^2 = 9ab$.

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

38) If y = x sin x cos x then, find $\frac{dy}{dx}$

39) Evaluate $\int e^x \sec x(1+\tan x)dx$

40) Prove that the points whose position vectors $2\vec{i}+4\vec{j}+3\vec{k}$, $4\vec{i}+\vec{j}+9\vec{k}$ and $10\vec{i}-\vec{j}+6\vec{k}$ form a rt angles Δ

IV. Answer the following questions. **7x5=35**

41) If A = {a, b, c,d, e}, B={b, e,f}, C = {a, e, f,h} then S.T A×(B$\cup$C) = (A×B) $\cup$ (A×C)

(OR)

Resolve the rational expression $\frac{x+12}{(x+1)^2(x-2)}$ into partial fraction

42) If A + B + C = 180° then P.T Sin 2A + Sin 2B + Sin 2C = 4 Sin A Sin B Sin C

(OR)

A committee of 7 peoples has to be formed from 8 men and 4 women, In how many ways can this be done when the committee consists of

(i) exactly 3 women ? (ii) alteast 3 women? (iii) atmost 3 women

43) By the principle of mathematical industion Prove that

for $n \geq 1$ $1^3 + 2^3 + 3^3 + \ldots + n^3 = \left(\frac{n(n+1)}{2}\right)^2$

(OR)

Prove that $\sqrt[3]{x^3+7} - \sqrt[3]{x^3+4}$ is approximately equal to $\frac{1}{x^2}$ when x is large

44) S.T the equation $9x^2 - 24xy + 16y^2 - 12x + 16y - 12 = 0$ represents a pair of parallel lines. Find the distance between them.

(OR)

Prove that: $\lim_{\theta \to 0} \frac{\sin\theta}{\theta} = 1$

45) S.T the points whose position vectors are $4\vec{i} + 5\vec{j} + \vec{k}, -\vec{j} - \vec{k}, 3\vec{i} + 9\vec{j} + 4\vec{k}$ and $-4\vec{i} + 4\vec{j} + 4\vec{k}$ are coplanar

(OR)

Evaluate : $\int \sqrt{x^2 + 2x + 10}\, dx$

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46) Evaluate: $\int \frac{3x - 9}{(x-1)(x+2)(x^2+1)}\, dx$

(OR)

If $y = e^{\tan^{-1}x}$, S.T $(1+x^2)\, y'' + (2x-1)\, y' = 0$

47) using factor theorem, S.T $\begin{vmatrix} 1 & 1 & 1 \\ x & y & z \\ x^2 & y^2 & z^2 \end{vmatrix} = (x-y)(y-z)(z-x)$

(OR)

Suppose the chances of hitting a target by a person x is 3 times in 4 shots, y is 4 times in 5 shots, and by z is 2 times in 3 shots. They fire simultaneously exactly one time. What is the probability that the target is damaged by exactly 2 hits?

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