Chengalpattu - D.K

FIRST REVISION TEST - 2025

Standard - XI

MATHEMATICS

Reg.No

Time: 3.00 hrs. *Marks: 90*

PART - A

I. **Choose the correct answer:** 20×1=20

1. Let A and B be subsets of the universal set N, the set of natural numbers. Then A'∪ [(A∩B)∪B'] is
   a) A b) B c) A' d) N.
2. If the function f : [-3,3] → s defined by f (x) = x^2 is onto, then S is
   a) [-3, 3] b) R c) [-9, 9] d) [0, 9]
3. Two items are chosen from a lot containing twelve items of which four are defective, then the probability that atleast one of the item is defective
   a) $\frac{19}{33}$ b) $\frac{17}{33}$ c) $\frac{23}{33}$ d) $\frac{13}{33}$
4. $\int \frac{\sqrt{\tan x}}{\sin 2x} dx$ is
   a) $\sqrt{\tan x} + c$ b) $2\sqrt{\tan x} + c$ c) $1/4\sqrt{\tan x} + c$ d) $1/2\sqrt{\tan x} + c$
5. $\int \frac{dx}{e^x - 1}$ is
   a) $\log |e^x + 1| - \log |e^x| + c$ b) $\log |e^x - 1| - \log |e^x| + c$
   c) $\log |e^x| - \log |e^x - 1| + c$ d) $\log |e^x| + \log |e^x - 1| + c$.
6. For the function $f(x) = \begin{cases} x+2, & x > 0 \\ x-2 & x < 0 \end{cases}$
   a) $\lim_{x \to 2^-} f(x) = -1$ b) $\lim_{x \to 0} f(x)$ does not exist c) $\lim_{x \to 0^-} f(x) = -1$ d) $\lim_{x \to 0^+} f(x) = 1$
7. If $f(x) = \begin{cases} 2a - x, & \text{for } -a < x < a \\ 3x - 2a, & \text{for } x \geq a \end{cases}$ Then which one the following is true?
   a) f(x) is continuous for all x in R b) f(x) is differentiable for all x ≥ a
   c) f(x) is not differentiable at x = a d) f(x) is discontinuous at x = a
8. The maximum value of $4\sin^2 x + 3\cos^2 x + \sin\frac{x}{2} + \cos\frac{x}{2}$ is
   a) $4 + \sqrt{2}$ b) $3 + \sqrt{2}$ c) 9 d) 4
9. The principal value of $\text{Cosec}^{-1}(-2)$ is
   a) $\frac{-\pi}{3}$ b) $\frac{-\pi}{6}$ c) $\frac{\pi}{6}$ d) $\frac{\pi}{3}$

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10. If $\vec{a}$ and $\vec{b}$ include an angle 120° and their magnitudes are 2 and $\sqrt{3}$ then $\vec{a}.\vec{b}$ is equal to

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

11. The number of 5 digit numbers all digits of which are odd is

a) 5^5 b) 5^6 c) 625 d) 25

12. The HM of two positive numbers whose AM and GM are 16, 8 respectively is

a) 5 b) 4 c) 6 d) 10

13. The line $\frac{x}{a}-\frac{y}{b}=0$ has the slope 1, if

a) a = b b) only for a = 1, b = 1 c) a > b d) a < b

14. The expansion of $(1-x)^{-2}$ is

a) $1 - x + x^2 - .....$ b) $1 + x + x^2 + ...$ c) $1 - 2x + 3x^2 - .....$ d) $1 + 2x + 3x^2 + ...$

15. 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)

16. If the points (x, -2), (5, 2), (8, 8) are collinear then x is equal to

a) 1/3 b) 1 c) 3 d) -3

17. If $\vec{a}=\hat{i}+\hat{j}+\hat{k}$, $\vec{b}=2\hat{i}+x\hat{j}+\hat{k}$, $\vec{c}=\hat{i}-\hat{j}+4\hat{k}$ and $\vec{a}.(\vec{b}\times\vec{c})=70$, then x is equal to

a) 26 b) 7 c) 10 d) 5

18. If $\frac{ax}{(x+2)(2x-3)}=\frac{2}{x+2}+\frac{3}{2x-3}$ then a =

a) 7 b) 4 c) 8 d) 5

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

a) $\frac{-x}{y}$ b) $\frac{x}{y}$ c) $\frac{y}{x}$ d) $\frac{-y}{x}$

20. The number of roots of $(x+3)^4 + (x+5)^4 = 16$ is

a) 3 b) 2 c) 4 d) 0

PART - B

II. Answer any seven questions: (Ques.No.30 is compulsory) **7×2=14**

21. If n [P(A)] = 1024, n(A∪B) = 15 and n[P(B)] = 32 then find n (A∩B) = 0

22. Write the use of horizontal line test.

23. Resolve the rational expression $\frac{1}{x^2-a^2}$ into partial fractions.

24. Convert (i) 18° to radians (ii) -108° to radians
25. If $nc_4 = 495$, what is n ?
26. Find the locus of P, that moves at a constant distant of (i) two units from the x - axis (ii) three units from the y - axis
27. Construct an m × n matrix A = [aij], where aij given by $a_{ij} = \frac{(i-2j)^2}{2}$ with m = 2, n = 3.
28. Find a direction ratio and direction cosines of the following vector $3\hat{i} + 4\hat{j} - 6\hat{k}$
29. Differentiate $y = \sin(x^2)$
30. Evaluate the following with respect to x $\int \frac{1}{(3x+7)^4} dx$

PART - C

III. Answer any seven questions. Q.No.40 is compulsory. **7×3=21**

31. Find the range of $f(x) = \frac{1}{1-3\cos x}$
32. Find the value of the product: $\begin{vmatrix} \log_3 64 & \log_4 3 \\ \log_3 8 & \log_4 9 \end{vmatrix} \times \begin{vmatrix} \log_2 3 & \log_8 3 \\ \log_3 4 & \log_3 4 \end{vmatrix}$
33. Find the nearest point on the line x - 2y = 5 from the origin.
34. If x is small show that $\sqrt{\frac{1-x}{1+x}} = 1 - x + \frac{x^2}{2}$ (approx.)
35. Prove that $\lim_{x \to 0} \frac{a^x - 1}{x} = \log a$, a > 0.
36. Given that P(A) = 0.52 , P (B) = 0.43, and $P(A \cap B) = 0.24$, find (i) $P(A \cap \bar{B})$ (ii) $P(A \cup B)$ iii) $P(\bar{A} \cap \bar{B})$.
37. Examine the continuity of the function cotx + tanx
38. If A + B = 45° then prove that (1 + tan A) (1 + tanB) = 2
39. Find the vectors of magnitude 6 which are perpendicular to both vectors $\vec{a} = 4\hat{i} - \hat{j} + 3\hat{k}$ and $\vec{b} = -2\hat{i} + \hat{j} - 2\hat{k}$
40. Evaluate : $\int (x-3)\sqrt{x+2}\, dx$.

PART - D

IV. Answer all the questons : 7×5=35

41. a) If f, g : R → R are defined by f(x) = | x | + x and g(x) = | x | - x, find gof and fog. **(OR)**
    b) In the set Z of integers, define mRn if m - n is a multiple of 12. Prove that R is an equivalence relation.

42. a) Solve the equation - $x^2 + 3x - 2 \geq 0$ **(OR)**
    b) State and prove Sine formula.

43. a) Prove that in any ΔABC, $\Delta = \sqrt{s(s-a)(s-b)(s-c)}$, where s is the semi perimeter of ΔABC. **(OR)**

    b) Do the limit of the function $\frac{\sin(x-[x])}{x-[x]}$ exist as $x \to 0$? State the reasons for your answer.

44. a) Find the value of $\sqrt[3]{126}$ correct to two decimal places. **(OR)**
    b) For the given base curve y = sinx, draw y = ½ sin2x

45. a) Prove that $\begin{vmatrix} 1 & x^2 & x^3 \\ 1 & y^2 & y^3 \\ 1 & z^2 & z^3 \end{vmatrix} = (x-y)(y-z)(z-x)(xy+yz+zx)$ **(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.

46. a) Find $\frac{d^2y}{dx^2}$ if $x^4 + y^4 = 16$. **(OR)**

    b) If the equation $\lambda x^2 - 10xy + 12y^2 + 5x - 16y - 3 = 0$ represents a pair of straight lines, find (i) the value of λ and the separate equations of the lines. (ii) Angle between the lines (iii) point of intersection of the lines

47. a) Evaluate the integral $\int \frac{2x+1}{\sqrt{9+4x-x^2}} dx$ **(OR)**

    b) A consulting firm rents car from three agencies such that 50% from agency t, 30% from agency M and 20% from agency N. If 90% of the cars from L, 70% of cars from M and 60% of the cars from N are in good conditions.
    i) What is the probability that the firm will get a car in good condition?
    ii) If a car is in good condition, what is the probability that it has come from agency N?

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