Vidya Vikas Mandal's

Std : XI Ramacrisna Madeva Salgaocar Higher Secondary School Dur: 3hr

Date : 04/03/2025 Margao – Goa Marks : 80

Final Examination 2025

Subject : MATHEMATICS AND STATISTICS

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1. All questions are compulsory.
2. The question paper consists of 30 questions.
3. Question number 1 to 7 is a multiple choice/VSA type question of one mark each
4. Question numbers 8 to 14 are short answer type -I question of two marks each.
5. Question numbers 15 to 21 are short answer type -II question of three marks each.
6. Question numbers 22 to 28 are long answer type-1 question of four marks each.
7. Question numbers 29 to 30 are long answer type-2 question of five marks each.
8. There is no overall choice in the paper. However internal choice is provided in 2 question of 3 marks ,in 2 question of 4 marks and in 2 questions of 5 marks.
9. Use of calculators is not permitted.

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1. The derivative of cosecx w.r.t x is -------.

- - cosecx cotx
- Secx tanx
- Sec^2x
- - $cosec^2x$

2. $cos^2x - sin^2x$ = -------.

- Sin2x
- Cos2x
- Tan2x
- Cot2x

3. The equation of circle with center at (2 ,5) and radius 5 units is -------.

- $x^2 + y^2+4x -10y +4 = 0$
- $x^2 + y^2-4x -10y +4 = 0$
- $x^2 + y^2+4x +10y +4 = 0$
- $x^2 + y^2+4x -10y - 4 = 0$

4. Coordinate planes divide the space into --------- octants.

- 4
- 6
- 8
- 10

5. Write the negation of the statement " The number 3 is less than 1".
6. Define a 'Parabola'.
7. Find the distance between the lines 4x+3y-11=0 and 4x+3y -15 =0.
8. Evaluate $\lim_{x\to 0} \frac{3^x-4^x}{7^x-1}$.
9. 3 coins are tossed together .Find the probability of getting
   (i) exactly 2 heads (ii) at least 2 heads.
10. Find the radian measure of $120^\circ 30'$.
11. Find the focus and equation of directrix of the parabola $x^2 = -15y$.
12. Find the coefficient of x^4y in $(2x + 3y)^5$.
13. If E and F are events such that P(E) = 0.6 , P(F) = 0.3 and P(E $\cup$ F) = 0.8
    Find (i) P(E and F) (ii) P(not F).
14. Evaluate $\lim_{x\to 5} \left[\frac{x^2-25}{x^2-4x-5}\right]$.
15. Reduce the equation 5x + 10y -35 = 0 into (i) slope – intercept form
    (ii) Intercept form

16. Evaluate $\lim_{x \to 0} \frac{\sin x (1-\cos x)}{x^2}$

OR

$\lim_{x \to 3} \frac{x-3}{\sqrt{x^2-5}-2}$

17. (i) Is the sentence '23 is a prime number' a statement? Justify your answer.
    (ii) write the contrapositive and converse of the statement
    " If a set is finite, then its power set has a finite number of elements".

18. Find the co-ordinates of the points which divides the line joining the points (1, 5, 4) and (2, 3, -7) , externally in the ratio 3 :4.

19. Find the eccentricity, coordinates of foci and length of latus rectum of the hyperbola $\frac{x^2}{3} - \frac{y^2}{2} = 1$

OR

Find the eccentricity, coordinates of foci and length of latus rectum of the hyperbola $\frac{y^2}{144} - \frac{x^2}{25} = 1$.

20. Find the multiplicative inverse of $z = -3+5i$.

21. In a large metropolitan area the probabilities are 0.87, 0.36, 0.30 that a family randomly chosen for a sample survey owns a color television set, a black and white television set, or both kinds of sets .What is the probability that a family neither owns color television nor black and white television .

22. If A (2,3) ,B(5,7) and C(-1,-4) are the vertices of a triangle ABC. Find the equation of (i) altitude through C
    (ii) median through B.

OR

If P(3,2) ,Q(7,5) and R(-2, 8) are the vertices of a triangle PQR. Find the equation of (i) altitude through P
    (ii) side PQ

23. Using binomial theorem , write the expansion of $(y^2 + 2x)^6$.

24. Show that the points A(3,-1, 2) , B(1,2,-4) ,C(-1,1,2) and D(1,-2, 8) are the vertices of a parallelogram.

25. If $\tan x = \frac{4}{3}$, x lies in third quadrant. Find the values of cotx, sinx and cosecx.

26. Find the eccentricity , foci , length of latus rectum and length of major axis of the ellipse $\frac{x^2}{64} + \frac{y^2}{36} = 1$.

27. Differentiate the following w.r.t. x

(i) y = secx tanx

(ii) y = $\frac{3x^4+8}{7x+24}$

OR

Differentiate the following w.r.t. x

(i) y = $(4x^2-x)(x^3-8x^2+12)$

(ii) y = $\frac{x+\cos x}{\tan x}$

28. Find the equation of a straight line which passes through the point (5,6) and cuts intercepts from the axes , which are equal in magnitude but opposite in sign.

29. The staff of a bank consists of 4 managers and 10 officers . A committee of two managers and three officers is to be formed.
Find the number of arrangements possible if

(i) a particular manager is included.

(ii) a particular officer is excluded

OR

How many words, with or without meaning can be made from letters of the word **'PROBLEM'** ,assuming that no letter is repeated,
if (i) word starts with letter L and ends with letter M

(ii) all the vowels are all together

30. Find the middle terms in the expansion of $\left(x + \frac{1}{2x}\right)^9$.

OR

Find the middle terms in the expansion of $\left(\frac{2x^2}{3} - \frac{3}{2x^2}\right)^7$.

**** THE END ***