Vidya Vikas Mandal's

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

Date : 6/10/2025 Margao – Goa Marks : 80

First Term Exam

Subject : MATHEMATICS AND STATISTICS

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1. The question paper consists of 30 questions.
2. Question number 1 to 7 is a multiple choice/VSA type question of one mark each
3. Question numbers 8 to 14 are short answer type -I question of two marks each.
4. Question numbers 15 to 21 are short answer type -II question of three marks each.
5. Question numbers 22 to 28 are long answer type-I question of four marks each.
6. Question numbers 29 to 30 are long answer type-II question of five marks each.
7. 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.
8. Use of calculators is not permitted.

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1. Which of the following is an example of a geometric progression -------.

- 1,2,3,4
- 3,5,7,9
- 1,3,9, 27
- 9, 20,21,28

2. $2\sin x \cos y$ = -------.

- $\sin(x+y) + \sin(x-y)$
- $\sin(x+y) - \sin(x-y)$
- $\cos(x+y) + \cos(x-y)$
- $\cos(x+y) - \cos(x-y)$

3. The Conjugate of a complex number z = a+ ib is -------.

- $\bar{z} = a + ib$
- $\bar{z} = -a - ib$
- $\bar{z} = -a + ib$
- $\bar{z} = a - ib$

4. 1- sin2x = ----------.

- $(\cos x - \sin x)^2$
- $(\cos x + \sin x)^2$
- $\cos^2 x - \sin^2 x$
- $\cos^2 x + \sin^2 x$

5. Define Modulus of a complex number.

6. Define Permutation.

7. Define a Subset of a set .

8. Find the mean deviation about the median for the following data
   7 ,9,12,15,18,20,25.

9. If $\frac{1}{5!} + \frac{1}{6!} = \frac{x}{7!}$. Find x.

10. State and draw the Modulus Function graph.

11. Solve the quadratic equation $x^2 + 4x + 5 = 0$.

12. A question paper has two parts, Part A and Part B , each containing 10 questions. If a student has to choose 8 from Part A and 5 from Part B, in how many ways can he choose the questions?

13. If AXB = {(a,1),(a,5),(a,2),(b,2),(b,5),(b,1)} . Find A, B and BXA.

14. Solve the quadratic equation $2x^2 + 3x + 5 = 0$.

15. Solve the inequalities for $\frac{2x-1}{3} \geq \frac{3x-2}{4} - \frac{2-x}{5}$ for real x.

16. If the 3rd term of an A.P is 23 and the 9th term is 11. Find the nth term of the A.P.

OR

A man saved Rs 16,500 in 10 years. In each year after the first, he saved Rs 100 more than in the preceding year. How much did he save in the first year.

17. A horse is tied to a post by a rope. If the horse moves along a circular path keeping the rope tight and describes 88 meters when it has traced out 72° at the center, find the length of the rope. (Use $\pi = \frac{22}{7}$)

18. If $f(x) = x^2 - 2x + 3$, $0 \leq x \leq 3$. Find f(1) and x, if f(x) = 6.

19. Out of five boys and three girls a committee of five is to be formed. In how many ways can this be done if the committee contains atleast 2 girls.

OR

From 8 ladies and 7 gentlemen can a committee of 3 ladies and 4 gentlemen will be appointed if a particular lady is included .

20. Find $3 + 33 + 333 + \ldots$ n terms.

21. Prove that $(\cos A + cosB)^2 + (sinA + sinB)^2 = cos^2\left(\frac{A-B}{2}\right)$.

22. Using Principle of Mathematical Induction, prove that

$$1^3 + 2^3 + 3^3 + 4^3 + \ldots + n^3 = \left[\frac{n(n+1)}{2}\right]^2$$

OR

Using Principle of Mathematical Induction, prove that

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

23. Find three numbers in G.P, such that their sum is 35 and their product is 1,000.

24. Solve the following system of inequalities graphically

$$x + 2y \geq 4$$
$$x \leq 5$$
$$y \leq 3$$

25. If $\sin x = \frac{3}{4}$, x lies in second quadrant. Find the values of cosec x, cos x and secx.

26. Express each of the complex number given below in the form a+ib.

(i) $z = \frac{1+3i}{1-2i}$

(ii) $z = \left[\left(\frac{1}{3} + i\frac{7}{3}\right) + \left(4 + i\frac{1}{3}\right) - \left(-\frac{4}{3} + i\right)\right]$.

27. In a survey of 200 students of a school, it was found that 120 study Maths, 90 study Physics and 70 study Chemistry. 40 study Maths and Physics, 30 study Physics and Chemistry, 50 study Chemistry and Maths and 20 study all the 3 subjects. Find the number of students who study

(i) atleast one of the subjects

(ii) only Physics

(iii) Chemistry and Maths but not Physics

OR

In a survey of 400 movie viewers, 150 were listed as liking movie "A", 100 as liking movie "B "and 75 were listed as liking both movies "A" and "B". Find how many people were liking

(i) A or B or both

(ii) neither movie A nor B

(iii) Only movie A

28. Using Principle of Mathematical Induction, prove that

$1.2.3 + 2.3.4 + \ldots + n(n+1)(n+2) = \frac{n(n+1)(n+2)(n+3)}{4}$.

29. A school has to display 3 trophies for Economics, 2 trophies for History and 4 trophies for languages .In how many ways can the trophies be arranged ,if

(i) the trophies of the same subject are always kept together

(ii) only the economic trophies are kept together

(iii) the economic trophies are never kept together

OR

Find the number of arrangements of the letters of the word 'INSTITUTION'. In how many of these arrangements ,

(i) do the vowels always occur together

(ii) the vowels are never together

30. Find the mean deviation about mean for the following data

Age(years)	20-30	30-40	40-50	50-60	60-70	70-80
No of Employees	6	10	12	8	4	2

OR

Find the mean deviation about median for the following data

Age(years)	10	11	12	13	14	15	16
frequency	3	8	14	19	7	6	3

**** THE END ***