Vidya Vikas Mandal's

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

Date : 18/10/2023 Margao – Goa Marks : 80

First Term Exam

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 four 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 conjugate of a complex number z = a+ib is -------.

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

2. $\cos(\pi - x) =$ -------.

- $-\cos x$
- $-\sin x$
- $\cos x$
- $\sin x$

3. The 5^h term of the G.P. 2,6,18,... is. -------.

- 54
- 81
- 162
- 486

4. Cos 2x = ----------.

- $\cos^2 x - \sin^2 x$
- $\cos^2 x + \sin^2 x$
- $1 - \sin^2 x$
- $\cos^2 x - 1$

5. Define Modulus of a complex number.

6. Define Permutations.

7. Define Power Set .

8. Find the mean deviation about the median for the following data
   4, 6, 9, 3, 10 ,13, 2.

9. If $\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$. Find x.

10. Define (i) Arithmetic Progression
    (ii) Geometric Progression

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

12. If $f(x) = 3x$ and $g(x) = 2x - 1$. Find $f(g(x))$.

13. Rob has 4 shirts, 3 pairs of pants, and 2 pairs of shoes that all coordinate. How many outfits can rob put together.

14. Solve the quadratic equation $3x^2 + x + 1 = 0$.

15. Solve the inequalities for $\frac{5(x-2)}{3} \leq \frac{3(2-x)}{5}$ for real x.

16. In a G.P , the third and fifth terms are 32 and 128 respectively. Find the first term and common ratio.

OR

Find the 35th term of the sequence 4, 0, -4 ,-8,... .Also find out which term of the sequence is -392.

17. Find the degree measure corresponding to 6 radians. (Use $\pi = \frac{22}{7}$).

18. If f(x) = 6x +k and f(1) = 19 . Find the value of k , f(2) and f(4).

19. In how many ways can a team of 3 boys and 3 girls can be selected from 6 boys and 5 girls.

OR

Determine the number of 5 card combinations out of a deck of 52 cards, if there are exactly 2 aces in each combination.

20. Find 6 +66 +666+ .... n terms.

21. Prove that $\frac{\sin 5x - 2\sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$.

22. Using Principle of Mathematical Induction, prove that

$1^2 + 2^2 + 3^2 + 4^2 + \ldots + n^2 = \frac{n(n+1)(2n+1)}{6}$.

OR

Using Principle of Mathematical Induction, prove that

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

23. Find the sum of all natural numbers lying between 200 and 400 ,which are divisible by 7.

24. Solve the following system of inequalities graphically

$$2x + y \geq 4$$
$$x + y \leq 3$$
$$2x - 3y \leq 6$$

25. If $\cos x = \frac{1}{2}$, x lies in fourth quadrant. Find the values of sec x, sinx and cosecx.

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

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

(ii) $z = (1 - 4i) - (-6 + 5i)$

27. In a survey of 25 students , it was found 15 had taken Maths, 12 had taken Physics, 11 had taken chemistry , 5 had taken Maths and chemistry, 9 had taken Maths and Physics, 4 had taken Physics and Chemistry and 3 had taken all the 3 subjects. Find the number of students that had taken

(i) Only one of the subject

(ii) Atleast one of the three subjects

(iii) None of the subjects

OR

From 2,000 literate individuals of a town , 60% read newspaper A, 55% read newspaper B and 20% read neither A nor B. How many read both the newspapers.

28. Using Principle of Mathematical Induction, prove that

$$1.2 + 2.3 + 3.4 + \ldots + n.(n+1) = \frac{n(n+1)(n+2)}{3}.$$

29. There are 5 books on Hindi and 3 books on Geography. Find the number of ways in which these books can be arranged so that

(i) All Hindi books are together and all Geography Books are together.

(ii) Only Books on Hindi are together

(iii) Books on Geography are not together

OR

How many words, with or without meaning can be made from letters of the word **'NUMBERS'** ,assuming that no letter is repeated, if (i) 4 letters are used at a time

(ii) word starts with B and ends with M

(iii) all letters are used but first letter is a vowel.

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

Marks	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No of students	8	10	15	25	20	18	9	5

OR

Find the mean deviation about median for the following data

x_i	74	89	42	54	91	94	35
f_i	20	12	2	4	5	3	4

**** THE END ***