AMRITA VIDYALAYAM

SECOND TERMINAL EXAMINATION 2018 -'19

Class : XI **Marks : 100**

Time : 3 hrs

MATHEMATICS

GENERAL INSTRUCTIONS:

1. All questions are compulsory.

2. This question paper consists of 29 questions divided into four sections A, B, C and D.
Section A comprises of 4 questions of 1 mark each.
Section B comprises of 8 questions of 2 marks each.
Section C comprises of 11 questions of 4 marks each.
Section D comprises of 6 questions of 6 marks each.

3. Use of calculator is not permitted.

SECTION - A

1. Evaluate $\lim_{x \to \pi} \frac{\sin(\pi - x)}{\pi(\pi - x)}$
2. Find the slope of a line passing through the points (4, -6) and (-2, -5).
3. The arithmetic mean is 14 and one number is 20. Find the other number.
4. If ${}^nC_6 = {}^nC_4$, find ${}^nC_8$.

SECTION - B

5. Find the value of x for which the points (x , -1) (2, 1) and (4, 5) are collinear.
6. In a single throw of two dice, find the probability of getting a total of 8 on the faces of the dice.
7. Find the equation of the right bisector of the line segment joining the points (3, 4) and (-1, 2).
8. Find n if $\lim_{x \to 2} \frac{x^n - 2^n}{x - 2} = 80$, $n \in N$.
9. Write contrapositive and converse of the statement. 'If it snows, then the weather will be cold'.
10. Find the centre and radius of the circle $(x + 5)^2 + (y - 3)^2 = 36$.
11. How many numbers greater than 20,000 can be formed by using the digits 0, 1, 2, 3, 4 no digit being repeated in any number?
12. How many terms are there in the A.P 10, 13, 16, ……. 49?

SECTION - C

13. How many different words can be formed using all the letters of the word ALLAHABAD? In how many of them both L's do not come together?

    OR

    If ${}^nC_2 - {}^nC_1 = 35$, then find the value of n.
14. A and B are events such that P (A) = 0.42, P (B) = 0.48 and P (A and B) = 0.16. Determine
    a) P (not A) b) P (not B) c) P (A or B).
15. Find the sum of all integers which are divisible by 7 and lying between 50 and 500.
16. If ${}^5P_r = 2.{}^6P_{r-1}$, find r.

    OR

    If all the letters of the word AGAIN be arranged as in a dictionary. What is the fiftieth word?
17. Find the sum of n terms whose n^{th} term is n (6n + 4).
18. Find the equation of the line passing through the point (1, 1) which is
    a) parallel to 2x + 3y + 4 = 0. b) perpendicular to 2x + 3y + 4 = 0.

19. Find the equation of the lines which passes through the point (3, 4) and cuts off intercepts from the co-ordinate axes such that their sum is 14.
20. Find the equation of a circle with centre (2, 2), which passes through the point (4, 5).
21. Evaluate the following limits.

a) $\lim_{x \to 4} \frac{4x + 3}{x-2}$ b) $\lim_{x \to 0} \frac{\sin 5x}{2x}$ c) $\lim_{x \to 0} \frac{ax + x \cos x}{b \sin x}$

OR

Find the derivative of $(x + 1) / (x - 1)$ from the first principle.

22. Find the equation of the hyperbola with eccentricity 3/2 and foci at $(\pm 2, 0)$.
23. Suppose $f(x) = \begin{cases} a + bx, & \text{when } x < 1 \\ 4, & \text{when } x = 1 \\ b - ax, & \text{when } x > 1 \end{cases}$

and $\lim_{x \to 1} f(x) = f(1)$. What are possible values of a and b?

SECTION - D

24. Find the probability that when a hand of 7 cards is drawn from a well shuffled pack of 52 cards, it contains

a) all kings. b) 3 kings. c) at least 3 kings.

25. Find the coordinates of the foci, the vertices, the length of major axis, eccentricity and the length of latus rectum of the ellipse $\frac{x^2}{100} + \frac{y^2}{400} = 1$
26. Find the image of the point (3, 8) with respect to the line $x + 3y = 7$ assuming the line to be a plane mirror.

OR

If p and q are the length of perpendicular from the origin to the lines
$x \cos q - y \sin q = k \cos 2q$ and $x \sec q + y \operatorname{cosec} q = k$ respectively. Prove that $p^2 + 4q^2 = k^2$.

27. A committee for 'value development in students' has to be formed from the student union of your school consisting of 9 boys and 4 girls. In how many ways 7 committee members can be selected from union by taking

a) exactly 3 girls? b) at least 3 girls? c) at the most 3 girls?

Discuss in brief about the values in the students you like to develop.

28. Find the sum to n terms of the series $3.1^2 + 5.2^2 + 7.3^2 + ...$

OR

The sum of three terms of a G.P is 124. Their product is 8000. Find them.

29. Find the derivative of the following.

a) $x \sin x$ b) $\frac{7x + 4}{4x - 7}$ c) $\frac{2 - 3 \cos x}{\sin x}$