Cheating Replaces Learning

TERM -1

**Time: 3Hour**
**M.Marks : 80**

EVP/X/Mathematics/2023-24

**General Instructions:**
**Section A consists of 20 questions 1 marks each.**
**Section B consists of 5 questions of 2 marks each.**
**Section C consists of 6 questions of 3 marks each.**
**Section D consists of 4 questions of 5 marks each.**
**Section E has 3 case based questions of 4 marks each with sub-part**

**Section A ( 1 marks each)**

1. $(\sec^2\theta-1)(\text{cosec}^2\theta-1)$ is equal to:
   (a) -1 (b) 1 (c) 0 (d) 2

2. Two dice are thrown together. The probability of getting the difference of numbers on their upper faces equals to 3 is:
   (a) $\frac{1}{9}$ (b) $\frac{2}{9}$ (c) $\frac{1}{6}$ (d) $\frac{1}{12}$

3. A card is drawn at random from a well-shuffled pack of 52 cards. The probability that the card drawn is not an ace is:
   (a) $\frac{1}{13}$ (b) $\frac{9}{13}$ (c) $\frac{4}{13}$ (d) $\frac{12}{13}$

4. The roots of the equation $x^2+3x-10=0$ are:
   (a) 2,-5 (b) -2,5 (c) 2,5 (d) -2,-5

5. If $\alpha$ and $\beta$ are zeroes of the polynomial $x^2-1$, then value of $(\alpha + \beta)$ is:
   (a) 2 (b) 1 (c) -1 (d) 0

6. If $\alpha$ and $\beta$ are zeroes of the polynomial $p(x) = 4x^2-3x-7$, then $\frac{1}{\alpha}+\frac{1}{\beta}$ is:
   (a) $\frac{7}{3}$ (b) $-\frac{7}{3}$ (c) $\frac{3}{7}$ (d) $-\frac{3}{7}$

7. For the following distribution:

| Marks Below | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|
| Number of Students | 3 | 12 | 27 | 57 | 75 | 80 |

The modal class is:

(a) 10-20 (b) 20-30. (c) 30-40. (d) 50-60

8. The largest number that divides 70 and 125, which leaves the remainders 5 and 8, is:

   (a) 65 (b) 15 (c) 13 (d) 25

9. If a fair coin is tossed twice, find the probability of getting atmost one head"

(a) $\frac{1}{2}$ (b) 1 (c) $\frac{3}{4}$ (d) *none*

10. What is the quadratic polynomial whose sum and the product of zeroes is $\sqrt{2}$, ⅓ respectively?

(a) $3x^2-3\sqrt{2}x+1$ (b) $3x^2+3\sqrt{2}x+1$ (c) $3x^2+3\sqrt{2}x-1$ (d) None of the above

11. Zeroes of polynomial can be expressed graphically. Number of zeroes of polynomial is equal to number of points where the graph of polynomial is:

(a) Intersects x-axis (b) Intersects y-axis (c) Intersects y-axis or x-axis (d) None

12. The sum of the probability of an event and non event is :

(a) 2 b) 1 (c) 0 (d) none of these.

13. The empirical relationship between the three measures of central tendency is

(a) 3 Median = Mode + 2 Mean (b) 2 Median = Mode + 2 Mean

(c) 3 Median = Mode + Mean (d) 3 Median = Mode – 2 Mean

14. The equation $2x^2 + kx + 3 = 0$ has two equal roots, then the value of k is

(a) $\pm\sqrt{6}$ (b) $\pm 4$ (c) $\pm 3\sqrt{2}$ (d) $\pm 2\sqrt{6}$

15. If the zeroes of the quadratic polynomial $ax^2+bx+c$, $c\neq 0$ are equal, then

(a) c and b have opposite signs (b) c and a have opposite signs

(c) c and b have same signs (d) c and a have same signs

16. Their of equations $3x - 5y = 7$ and $-6x + 10y = 7$ have

(a) a unique solution (b) infinitely many solutions (c) no solution (d) two solutions

17. The value of k, for which the system of equations $x + (k + 1)y = 5$ and $(k + 1)x + 9y = 8k - 1$ has infinitely many solutions is

(a) 2 (b) 3 (c) 4 (d) 5

18. The mode and mean is given by 7 and 8, respectively. Then the median is:

(a) 1/13 (b) 13/3 (c) 23/3 (d) 33

Q 19 and Q20 are assertion reason based questions choose appropriate options

A. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
B. Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).
C. Assertion (A) is true but Reason (R) is false.
D. Assertion (A) is false but Reason (R) is true.

19. **Assertion (A):** The H.C.F. of two numbers is 16 and their product is 3072. Then their L.C.M. = 162.
**Reason(R):** If a and b are two positive integers, then H.C.F. × L.C.M. = a × b.

20. **Assertion** (A): The probability that a leap year has 53 Sundays is $\frac{2}{7}$
**Reason** (R): The probability that a non-leap year has 53 Sundays is $\frac{5}{7}$

## SECTION- B ( 2 marks)

21. (A) product of the roots of the quadratic equation $2x^2-9x+4=0$.

OR

(B) Find the discriminant of the quadratic equation $4x^2-5 = 0$ and hence comment on the nature of roots of the equation.

22. (A) Evaluate $2\sec^2\theta+3\operatorname{cosec}^2\theta-2\sin\theta\cos\theta$ if $\theta=45°$.

OR

(B) If $\sin\theta-\cos\theta=0$, then find the value of $\sin^4\theta+\cos^4\theta$.

23. Two numbers are in the ratio 2:3 and their LCM is 180. What is the HCF of these numbers?

24. If one zero of the polynomial $p(x)=6x^2+37x-(k-2)$ is reciprocal of the other, then find the value of k.
25. One – fourth of a herd of camels was seen in the forest. Twice the square root of the herd had gone to mountains and the remaining 15 camels were seen on the bank of a river. Find the total number of camels.

## SECTION-C (3 Marks )

26. Two water taps together can fill a tank in $9\frac{3}{8}$ hrs.The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately.Find the time in which each tap can separately fill the tank.

27. Find the value of 'p' for which one root of the quadratic equation $Px^2-14x+8-0$ is 6 times the other.
28. Prove that $\frac{sinA-2sin^3A}{2cos^3A-cosA} = tanA$

OR

Prove that $\sec A(1-\sin A)(\sec A+\tan A) = 1$.

29. Prove that $3+5\sqrt{5}$ is an irrational number.

30. Write any quadratic polynomial of your choice find its zeroes and verify relation between the zeroes and coefficient of quadratic polynomial.

31. Is the following situation possible? If so, determine their present ages. The sum of the ages of two friends is 20 years. Four years ago, the product of their age in years was 48. Justify your answer.

## SECTION D (5 Marks)

32. The monthly expenditure on milk in 200 families of a Housing Society is given below:

| Monthly Expenditure (in Rs) | 1000-1500 | 1500-2000 | 2000-2500 | 2500-3000 | 3000-3500 | 3500-4000 | 4000-4500 | 4500-5000 |
|---|---|---|---|---|---|---|---|---|
| Number of families | 24 | 40 | 33 | x | 30 | 22 | 16 | 7 |

Find the value of x and also, find the median and mean expenditure On milk.

33. A straight highway leads to the foot of a tower. A man standing on the top of the 75 m high tower observes two cars at angles of depression of 30 and 60, which are approaching the foot of the tower. If one car is exactly behind the other on the same side of the tower, find the distance between the two cars. (use 3-1.73)

OR

From top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 30°. Determine the height of the tower.

34. Solve graphically

$x - y = 6$

$2x - 2y = 2$

35. An express train takes 1 hour less than a passenger train to travel 132 km between Mysore and Bangalore (without taking into consideration the time they stop at intermediate stations). If the average speed of the express train is 11 km/hr more than that of the passenger train, find the average speed of the two trains.

## SECTION E ( 4 marks)

36. Two schools 'P' and 'Q' decided to award prizes to their students for two games of Hockey Rs.x per student and Cricket Rs.y per student. School "p decided to award a total of 9,500 for the two games to 5 and 4 students respectively; while school 'Q' decided to award 7,370 for the two games to 4 and 3 students respectively.

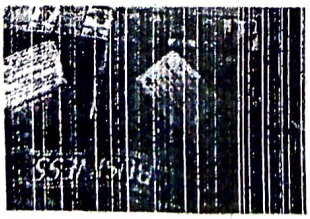
Based on the given information, answer the following questions:

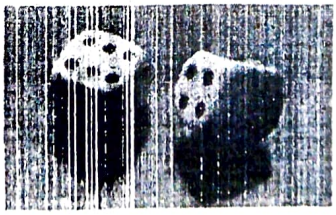
I. Represent the following information algebraically (in terms of x and y).
II. What is the prize amount for hockey?

OR

III. Prize amount on which game is more and by how much?
IV. What will be the total prize amount if there are 2 students each from two games?

37. Rahul and Ravi planned to play Business ( board game) in which they were supposed to use two dice.





I. Ravi got first chance to roll the dice. What is the probability that he got the sum of the two numbers appearing on the top face of the dice is more then 10?

II. Rahul got next chance. What is the probability that he got the sum of the two numbers appearing on the top face of the dice is at most 13?

III. Now it was Ravi's turn. He rolled the dice. What is the probability that he got the sum of the two numbers appearing on the top face of the dice is less than or equal to 12?

38. Satellite flying at height h is watching the top of the two tallest mountains in Uttarakhand and Karnataka ,them being Nanda Devi (height 7,816m) and Mullayanagiri (height 1,930 m). The angles of depression from the satellite , to the top of Nanda Devi and Mullayanagiri are 30° and 60° respectively. If the distance between the peaks of two mountains is 1937 km , and the satellite is vertically above the midpoint of the distance between the two mountains. Now answer the following questions

I. What is the distance of the satellite from the top of Mullayanagiri ?

II. If a mile stone very far away from, makes angle 45° to the top of Mullayangiri mountain .So, find the distance of this mile stone form the mountain.

III. What is the distance of the satellite from the ground ?