



परमाणु ऊर्जा शिक्षण संस्था

Atomic Energy Education Society

टर्म-1/आवधिक परीक्षा-2 2023-24 Term-I/PT-II Examination 2023 - 24

कक्षा / Class : X

अवधि / Duration : 3 hours

विषय / Subject : Mathematics

अधिकतम अंक/ Maximum Marks : 80

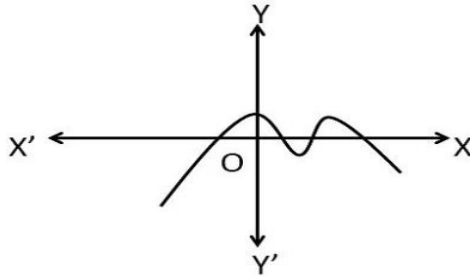
General Instructions:

1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has also been provided in the 2marks questions of Section E
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required, if not stated.

SECTION A (1 X 20 = 20)

1. If the HCF of two natural numbers are 15 and 180 and one of the numbers is 36, then the other number is _____.
 (a) 540 (b) 180 (c) 75 (d) 12
2. The product of the HCF and the LCM of the smallest odd prime number and the smallest odd composite number is _____.
 (a) 27 (b) 45 (c) 60 (d) 18
3. If one of the zeroes of the quadratic polynomial $y^2 + 3y + k$ is 2, then the value of k is _____.
 (a) 10 (b) -10 (c) 5 (d) -5

4. The number of zeroes of $p(x)$ represented by the given graph is _____.

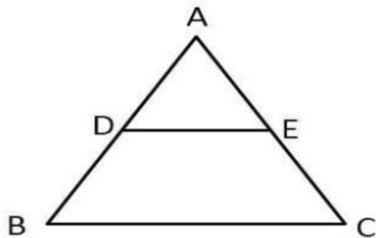


- (a) one (b) two (c) three (d) four

5. The system of linear equations $3x - 5y = -4$ and $18x - 30y = -24$ has _____.

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

6. In the figure, if $DE \parallel BC$, $AD = 3$ cm, $BD = 4$ cm and $BC = 14$ cm, then DE equals to _____.



- (a) 10 cm (b) 8 cm (c) 6 cm (d) 4 cm

7. A quadratic polynomial whose zeroes are 5 and -3 is _____.

- (a) $x^2+2x-15$ (b) $x^2-2x-15$ (c) x^2-2x+1 (d) $x^2+2x+15$

8. The quadratic equation $x^2 - 30x + 225$ has _____ roots.

- (a) real (b) no real (c) real and equal (d) real and distinct

9. If nine times the 9th term of an AP is equal to 11 times the 11th term, then its 20th term is _____.
- (a) 3 (b) 1 (c) 0 (d) 2
10. The distance of the point (-3,4) from the origin is _____.
- (a) 7 units (b) 5 units (c) 11 units (d) $\sqrt{65}$ units
11. The midpoint of segment PQ is R (0, 4). If the coordinates of Q are (-2, 3), then the coordinates of P are _____.
- (a) (-2,-5) (b) (2, 9) (c) (-2, 11) (d) (2, 5)
12. Two APs have the same common difference. The first term of one of these is -1 and the other is -8. The difference between their fourth terms is _____.
- (a) 1 (b) -7 (c) 7 (d) 9
13. The sum of the first 100 positive integers is _____.
- (a) 5050 (b) 1050 (c) 1275 (d) 1265
14. If in two triangles ABC and DEF, $\frac{AB}{DE} = \frac{BC}{FE} = \frac{CA}{FD}$, then _____.
- (a) $\Delta FDE \sim \Delta ABC$ (b) $\Delta BCA \sim \Delta FDE$
(c) $\Delta FDE \sim \Delta CAB$ (d) $\Delta CBA \sim \Delta FDE$
15. The pair of equations $y = 0$ and $y = -7$ has _____.
- (a) one solution (b) two solutions
(c) infinitely many solutions (d) no solution
16. If the distance of the point (3, 5) from the X axis is k units, then k equals____.
- (a) 3 (b) 4 (c) 5 (d) 8

17. A quadratic polynomial one of whose zeroes is 5 and sum of the zeroes is 0, is _____.

- (a) $x^2 - 6x + 2$ (b) $x^2 - 36$ (c) $x^2 - 6$ (d) $x^2 - 25$

18. The zeroes of the quadratic polynomial $x^2 + 99x + 125$ are _____.

- (a) both positive (b) both negative
(c) one positive and one negative (d) both equal

ASSERTION REASONING BASED QUESTIONS

For the next two questions choose the correct one from the following options.

- a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation for assertion (A).
b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation for 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): If the lines $3x + 2ky - 2 = 0$ and $2x + 5y + 1 = 0$ are parallel, then the value of k is $\frac{15}{4}$.

Reason (R): The condition for parallel lines is $\frac{a_1}{b_1} = \frac{a_2}{b_2} = \frac{a_3}{b_3}$.

20. Assertion (A): The sum of the first 10 terms of the AP : -0.5, -1.0, -1.5, ... is 31.

Reason (R) : The sum of n terms of an AP is given as $S_n = \frac{n}{2}(2a + (n-1)d)$

where a is the first term and d is the common difference of the AP.

SECTION B (2 X 5 = 10)

21. Check whether 5^n can end with the digit 0 for any natural number n .
22. Find the roots of the given quadratic equation using the quadratic formula.

$$-2x^2 + 2x + 12 = 0$$

OR

Find k if the lines $3x-5y=9$ and $2x+ky=11$ are parallel.

23. Find the 10th term from the end of the AP 5, 9, 13,, 185.
24. ΔPQR is a triangle right angled at Q and $QS \perp PR$. Show that $PQ^2 = PS \times PR$.
25. Find the ratio in which the line segment joining the points (2, 5) and (3, -2) is divided by the X axis.

SECTION C (3 X 6 = 18)

26. Find the zeroes of the quadratic polynomial $x^2 - 2x - 8 = 0$ and verify the relationship between the coefficients.
27. Find the value of n for which the quadratic equation $(n-1)x^2 + 2(n-1)x + 1 = 0$ has equal roots.
28. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points then the other two sides are divided in the same ratio.

OR

Prove that if a line divides any two sides of a triangle in the same ratio then the line is parallel to the third side.

29. The sum of the denominator and the numerator of a fraction is 3 less than twice the denominator. If each of the numerator and the denominator is decreased by 1, the fraction becomes $\frac{1}{2}$. Find the fraction.

OR

Find two consecutive positive integers, the sum of whose squares is 365.

30. Prove that $\sqrt{5}$ is an irrational number.
31. Find a relation between x and y such that the point (x, y) is equidistant from the points $(6, 2)$ and $(2, 4)$.

SECTION D (5 X 4 = 20)

32. Find the coordinates of the points of trisection of the line segment joining the points $(4, 0)$ and $(-2, -3)$.
33. In ΔABC , D and E are two points on side AB such that $AD = BE$.
If $DP \parallel BC$ and $EQ \parallel AC$ then prove that $PQ \parallel AB$.

OR

If sides AB , BC and median AD of ΔABC are proportional to the corresponding sides PQ , QR and median PM of ΔPQR show that

$$\Delta ABC \sim \Delta PQR.$$

34. An aircraft covering 600 km, was slowed due to bad weather. The average speed for the trip was reduced by 200 km/hr and the duration of the flight was increased by 30 minutes. Find the original duration of the flight.
35. A sum of ₹ 1600 is to be used to give 10 cash prizes to students of a school for their overall academic performance. If each cash prize is ₹ 20 less than its preceding prize, find the value of the first five prizes.

OR

If the sum of the first 4 terms of an AP is 40 and that of the first 14 terms is 280, find the sum of its first n terms.

SECTION E (4 x 3 = 12)

CASE STUDY BASED QUESTION- 1

36. Riya has designed a flower bed in front of her house. There are 45 plants in the first row, 43 in the second, 41 in the third and so on.



On the basis of this information answer the following questions.

- (i) If there are 11 rows in the flower bed, how many plants will the last row have? (1)
- (ii) What is the difference between the number of plants in the 7th row and the 13th row? (2)

OR

- (ii) What is the sum of the number of plants in the 6th row and the 12th row? (2)
- (iii) If the flower bed has 10 rows find the total number of plants in the flower bed? (1)

CASE STUDY BASED QUESTION - 2

37. A classroom has been recreated on a Cartesian plane. Four friends Ravi, Vinod, Raghav and Vithal are shown as seated at points A (2, 3), B (7, 8), C (10, 5) and D (5, 0) respectively.

Based on the above information, answer the following questions :

- (i) Find the distance between Ravi and Raghav. (1)
- (ii) Find the distance between Vinod and Vithal. (1)
- (iii) Show that quadrilateral ABCD is a rectangle. (2)

OR

- (iii) Find the perimeter of quadrilateral ABCD. (2)

CASE STUDY BASED QUESTION - 3

38. The WONDERLAND amusement park charges ₹ 150 for a child and ₹ 400 for an adult. On Monday, 480 tickets were sold and the collection was ₹ 134500.



On the basis of the above information answer the following questions.

- (i) Let the number of children visited be x and the number of adults visited be y . Write the system of equations that models the situation. (1)
- (ii) How many children visited the park? How many adults visited the park? (2)

OR

- (ii) One day the park had 750 visitors and the total amount collected was ₹ 215000. How many children and adults visited the park? (2)
- (iii) What is the total amount collected if 300 children and 350 adults visited the park? (1)