17

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80 marks.
3hr.

Weightage:
Time Duration:

General Instructions:

1. This Question Paper has 5 Sections A-E.
2. In Section A, Questions no. 1 to 18 are multiple choice questions (MCQs) and questions number 19 and 20 are Assertion-Reason based questions of 1 mark each.
3. In Section B, Questions no. 21 to 25 are very short answer (VSA) type questions, carrying 2 marks each.
4. In Section C, Questions no. 26 to 31 are short answer (SA) type questions, carrying 3 marks each
5. In Section D, Questions no. 32 to 35 are long answer (LA) type questions carrying 5 marks each.
6. In Section E, Questions no. 36 to 38 are case study based questions carrying 4 marks each. Internal choice is provided in 2 marks questions in each case study.
7. All Questions are compulsory.
8. Draw neat figures wherever required.

SECTION A

1. For what value of K the pair of linear equations $5x-2y= 7$ and $10x-Ky-6=0$ don't have a solution:

a) 4
b) 7
c) -4
d) None of these

2. If Q $(2a-1, 4)$ is the mid-point of the segment joining the points P $(-8, 5)$ and R $(-6, 3)$, then the value of 'a' is

a) 2
b) -1
c) -2
d) None of these

3. Find the greatest number that will divide 445, 572 and 699 leaving remainders 4, 5 and 6 respectively.

a) 63
b) 36
c) 7
d) None of these

4. If α and β are two zeros of the polynomial $5x^2-3x+7=0$ the value $(\frac{1}{\alpha}+\frac{1}{\beta})$ is:

a) $\frac{3}{7}$
b) $\frac{-3}{7}$
c) $\frac{3}{5}$
d) None of these

5. The distance between $(2,5)$ and $(-2,2)$ is:

a) 9 units
b) 6 units
c) 5 units
d) None of these

6. The condition on 'a' and 'b' for $ax+bx + c = 0$ to represent a linear equation in two variables is:

a) $a \neq 0$ and $b \neq 0$
b) $a > 0$ and $b > 0$
c) $a < 0$ and $b < 0$
d) None of these
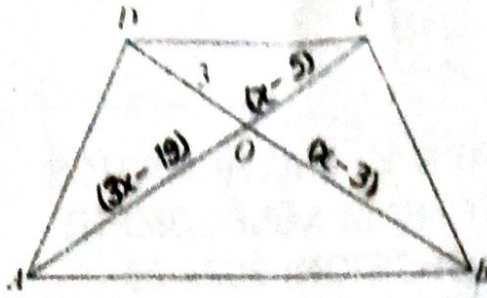
7. In the given figure, if AB|| DC, the value of x (in cm) will be

a) 8 cm   b) 9 cm   c) Both a and b   d) None of these

8. The common difference of an A.P. in which. $a_{15} - a_{11} = 48$, is

a) 12   b) 16   c) -12   d) None of these

9. The pair of linear equations $2x + 4y = 20$ and $4x + 8y = 40$ has :

  a) no solution   b) infinite number of solutions

  c) a unique solution   d) none of these

10. The diameter of a circle is of length 6cm. If one end of the diameter is $(-4,0)$, the other end on x -axis is at:

a) (2,0)   b) (0,2)   c) (0 ,4)   d) None of these

11. The equation $x^2 + 4kx + 4 = 0$ has real and equal roots, if

a) k = 0 and -1   b) k = 1 and -1   c) k = 4 and 1   d) k = 1 and 0

12. The middle term of the sequence 4, 8, 12, 16, ... 100 is

a) 46   b) 47   c) 48   d) None of these

13. If a and b are two positive integers such that the least prime factor of a is 7 and the least prime factor of b is 11. Then, the least prime factor of (a + b) is

a) 6   b) 4   c) 2   d) None of these

14. The HCF of two numbers 65 and 104 is 13. If LCM of 65 and 104 is 40x, then the value of x is :

a) 5   b) 40   c) 13   d) None of these

15. The ratio of the sum and product of the roots of the quadratic equation $5x^2 - 6x + 21 = 0$ is :

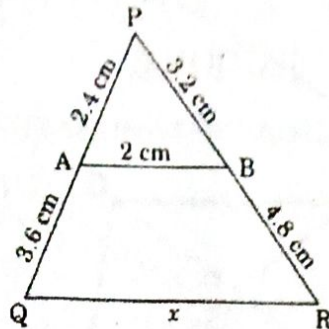a) 5:21   b) 21:5   c) 2:7   d) None of these

16. If one zero of the quadratic polynomial $x^2 + 9x + k$ is 1, then the value of k is

a) 10   b) -10   c) 5   d) -5

17. The perimeter of a triangle with vertices (0, 12), (0, 0) and (5, 0) is

a) 30 cm
b) 26 cm
c) 28cm
d) None of these

16. In the given figure, value of x (in cm) is

a) 4 cm
b) 5 cm
c) 6 cm
d) 8 cm

Assertion—Reason Type Questions

Questions number 19 and 20 are Assertion and Reason based questions carrying 1 mark each. Two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

a) Both Assertion and reason are correct and reason is correct explanation for Assertion

b) Both Assertion and reason are correct but reason is not correct explanation for Assertion

c) Assertion is correct but reason is false

d) Both Assertion and reason are false

19. Assertion: ABCD is a trapezium with DC ∥ AB. E and F are points on AD and BC respectively, such that EF ∥ AB. Then $\frac{BF}{FC} = \frac{AE}{ED}$

Reason : Any line parallel to parallel sides of a trapezium divides the non-parallel sides in the same ratio.(Proportionally)

20. Assertion: If numbers a, b, c are in A.P then 2b=a+c

Reason : Given three numbers are in AP, then the common difference will be same.

SECTION B

21 Find the roots of the quadratic equation $x^2 + 6\sqrt{2}x + 10 = 0$ (2)

(OR)

Sum of the areas of two squares is 400 m². If the difference between their sides is 16 m, then find the sides of the two squares. (2)

22. Prove that $(5\sqrt{2}-1)$ is an irrational number. If $\sqrt{2}$ is an irrational number (2)

23. For what value of k will (k + 9), (2k – 1) and (2k + 7) are the consecutive terms of an A.P. (2)

24. If $7x^2 - (2p^2 - 8)x + 16 = 0$ has two roots which are equal in magnitude but opposite in sign then find p. (2)

25. Prove that the points (3, 0), (6, 4) and (– 1, 3) are the vertices of an isosceles triangle (2)

(OR)

Find the ratio in which the point P(– 4, 6) divides the line segment joining the points A(– 6, 10) and B(3, – 8).

SECTION C

26. In trapezium ABCD, if AB || DC, AB = 18cm, DC=12cm and BD=20cm. Find DP and $\frac{CP}{AP}$. (3)
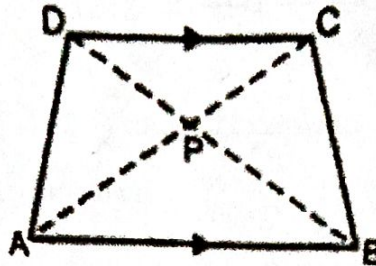
27. Show that the points (1, 7), (4, 2), (–1, –1) and (– 4, 4) are the vertices of a square. (3)

28. Answer both the questions (1.5+1.5)

(I) In an AP, the first term is 2, the last term is 29 and the sum of all the terms is 155. Find the common difference.

(II) If the sum of first 15 terms of an A.P. is 750 and its first term is 15, find the 20th term.

29. The LCM of two numbers is 14 times their HCF. The sum of LCM and HCF is 600. If one number is 280, then find the other number. (3)

(OR)

In a school, the duration of a period in junior section is 40 minutes and in senior section is 1 hour. If the first bell for each section ring at 9:00 a.m., when will the two bells ring together again? (3)

30. The angry Arjun carried some arrows for fighting with Bheeshm. With half the arrows, he cut down the arrows thrown by Bheeshm on him. Six arrows, he used to kill the rath driver of Bheeshm. With one arrow each he knocked down respectively the rath, flag and the bow of Bheeshm. Finally, with one more than four times the square root of arrows he laid Bheeshm unconscious on an arrow bed. Find the total number of arrows Arjun had.

(OR)

If Zeba was younger by 5 years than what she really is, then the square of her age (in years) would have been 11 more than five times her actual age. What is her age now? (3)

31. Points A and B are 70 km apart on a highway. One car start from A and the another one from B at the same time. If they travel in the same direction, they meet in 7 hours. But if they travel towards each other, they meet in one hour. Find the speed.

SECTION D

32. Answer both the questions: (2+3)

(I). Find the fourth vertex of parallelogram ABCD whose three vertices are (−2, 3), (6, 7) and (8, 3).

(II). Show that △ABC, where A(−2, 0), B(0, 2), and C(2, 0) and △PQR where P(−4, 0), Q(4, 0), R(0, 4) are similar triangles.
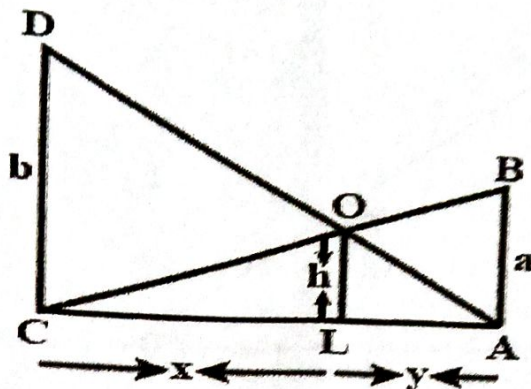
33. State and prove Thales's theorem.

<div align="center">(OR)</div>

$(1+4)$

Two poles of height 'a' meters and 'b' meters are ' p' meters apart. Prove that the height of the point of intersection of the lines joining the top of each pole to the foot of the opposite pole is given $\dfrac{ab}{a+b}$ meters.

(5)

34. Answer the following questions:

(3+2)

(I) The sum of ages of a father and his son is 45 years. Five years ago, the product of their ages (in years) was 124. Determine their present ages.

(II) Find the nature of roots and roots for $x^2+4x-2=0$

35. Answer the following questions.

(3+2)

(I). The students of a class are made to stand in rows. If 3 students are extra in a row, there would be 1 row less. If 3 students are less in a row, there would be 2 rows more. Find the number of students in the class.

(II) Solve the following pair of linear equations : $8x + 5y = 9$ and $3x + 2y = 4$

<div align="center">(OR)</div>

Answer the following questions.

(2.5+2.5)

(I). For which values of a and b do the following pair of linear equations have infinite solutions? $2x + 3y = 7$ and $(a - b) x + (a + b) y = 3a + b - 2$

(II). Five years hence, the age of Jacob will be three times that of his son. Five years ago, Jacob's age was seven times that of his son. What are their present ages?

SECTION E

36. Direction for Question:

In a school, students thought of planting trees in and around the school to reduce air pollution. It was decided that the number of trees, that each section of each class will plant, will be as the class, in which they are studying. Like a section of class I-A will plant 1 trees, another section of class I-B will plant 1 trees , a section of class II-A will plant 2 trees , and so on till class XII. There are three sections of each class. Based on the above information, answer the following questions.

I. What are first term and common difference of the AP formed ? (1)

II. How many trees will be planted by all the students? (1)

III. What is the sixth term from the ends of the AP formed ?

<div align="center">OR</div>

Find the total number of trees planted by class 9th and 10th Students together. (2)

37. Direction for Question:

Rohan is very intelligent in math. He always tries to relate the concept of math in daily life. One day he is walking away from the base of a lamp post at a speed of 4 m/s. Lamp is 20m above the ground. Based on the above information, answer the following questions.
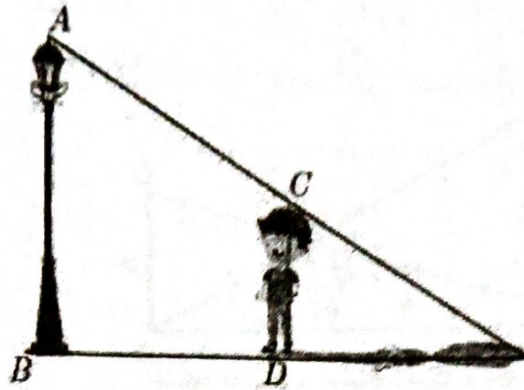

I. What is the distance of Rohan from pole after 8 seconds ? (1)

II. What is the length of his shadow after 12 seconds If Rohan's height is 10m. (1)

III. If after 8 seconds, length of shadow is 80 meter , what is the height of Rohan . (2)

OR

If after 4 seconds ,Rohan's height and length of the shadow is same, what is the length of shadow of lamp post. (2)

38. Direction for Question:

While playing in garden, Sahiba saw a honeycomb and asked her mother what is that. She replied that it's a honeycomb made by honey bees to store honey. Also, she told her that the shape of the honeycomb formed is parabolic. The mathematical representation of the honeycomb structure is shown in the graph.
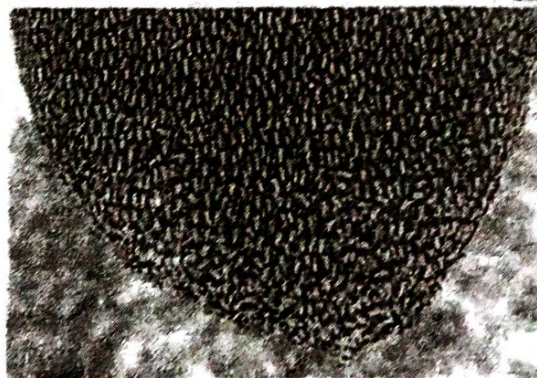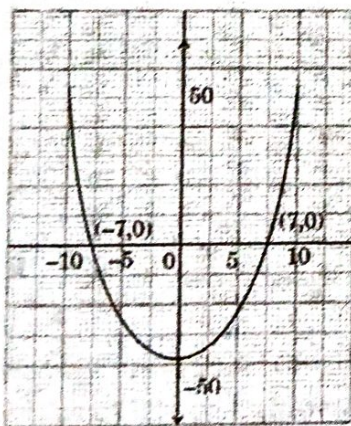
I. Find the sum and prdouct of zeros represented by the graph given ? (1)

II. Find the quadratic polynomial for above graph. (1)

III. If the zeroes of a polynomial $x^2+(2a+1)x+2b$ are 1 and 3,then determine the values of (a+b)

OR

If the square of difference of the zeroes of the polynomial $x^2+ px+45$ is 144, then find the value of p. (2)