SAMPLE PAPER
SESSION-2023-24
SUBJECT: MATHEMATICS
CLASS: IX

Time: 3Hr   **M.M: 80**

General Instructions :
1.   This question Paper has 5 Section 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 subparts 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.
8.   Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

SECTION-A

1.   If (4, 19) is a solution of the equation y=ax+3, then a=
     a) 4   b) 6
     c)3   d) 5
2. π is
     a)a rational number   b) an integer
     c) an irrational number   d) a whole number
3.   In a histogram the area of each rectangle is proportional to
     a) the class size of the corresponding class interval
     b) cumulative frequency of the corresponding class interval
     c) the class mark of the corresponding class interval
     d) frequency of the corresponding class interval
4.   The point (-5, 2) and (2, -5) lie in the
     a) II and III quadrants, respectively   b) same quadrant
     c) II and IV quadrants, respectively   d) IV and II quadrants, respectively
5.   A point C is said to lie between the points A and B if
     a) AC+CB=AB   b) Points A, C and B are collinear
     c) None of these   d) AC=CB
6.   How many linear equations in 'x' and 'y' can be satisfied by x=1, y=2?
     a) Infinitely many   b) Two
     c) Only one   d) Three
7.   In the given figure, ABCD is a Rhombus. Find the value of x and y if ABD =x,BAC=45^0,ADB=y

     a) x=35^0 and y=35^0 b) x=45^0 and y=45^0
     c) X=37^0 and y=37^0 d) X=40^0 and y=40^0

8. Two complementary angles are such that two times the measure of one is equal to three times the measure of the other. The measure of the smaller angle is
   a) 30^0 b) None of these
   c) 36^0 d) 45^0

9. If $x^2 + \frac{1}{x^2} = 623$, then $x + \frac{1}{x} =$
   a) 27   b) $\sqrt{3}$
   c) $3\sqrt{3}$ d) 25

10. The equation x-2=0 on number line is represented by
   a) infinitely many lines   b) two lines
   c) a point   d) a line

11. If the bisector of the angle A of a $\triangle ABC$ is perpendicular to the base BC of the triangle then the triangle ABC is :
   a) Isosceles   b) Obtuse Angled
   c) Equilateral   d) Scalene

12. In the given figure, ABCD is a Rhombus, if $\angle DAB = 70^0, \angle CDB$ is

   a) 45^0 b) 55^0
   c) 35^0 d) 65^0

13. In given fig., find $\angle POR$

   a) 240^0 b) 60^0
   c) 120^0 d) 360^0

14. Find value of $(121)^{\frac{1}{3}} \times (11)^{\frac{1}{3}}$
   a) 11   b) 0
   c) 1   d) 121

15. The figure formed by joining the mid-points of the adjacent sides of a rhombus is a:
   a) trapezium   b) rectangle
   c) square   d) none of these

16. Which of the following is zero of the polynomial $2x^3 + 3x^2 - 11x - 6$
   a) -15   b) 21
   c) -3   d) 0

17. If x+2 is a factor of $x^2 + mx + 14$, then m=
   a) 2   b) 9
   c) 7   d) 14

18. If slant height of a cone is 17 cm and the base radius is 8 cm, then the height of cone is :
   a) 15 cm   b) 16 cm
   c) 12 cm   d) 18 cm

19. **Assertion (A) :** The point (0, 3) lies on the graph of the linear equation 3x+4y=12
   Reason (R) : (0, 3) satisfies the equation 3x+4y=12
   a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false   (d) A is false but R is true

20. **Assertion (A) :** The side of an equilateral triangle is 6 cm then the area of the triangle is $9cm^2$
    Reason (R) : All the sides of an equilateral triangle are equal.
    a) Both A and R are true and R is the correct explanation of A.

    b) Both A and R are true but R is not the correct explanation of A.

    c) A is true but R is false

    d) A is false but R is true

SECTION-B

21. Using factor theorem, sow that g(x) is a factor of p(x), when $p(x) = 2x^4 + 9x^3 + 6x^2 - 11x - 6, g(x) = x - 1$.

22. The base of a right-angled triangle measures 4 cm and its hypotenuse measures 5cm. Find the area of the triangle.

23. Factorise : $a^3 - 2\sqrt{2}b^3$

    OR

    Factorise : $x^4 + x^2y^2 + y^4$

24. Find the volume and surface area of a sphere whose radius is 3.5 cm.

25. Find whether the given equation have x=2, y=1 as a solution :

    2x+3y=7

    OR
    Write four solutions of the equation : 2x+y=7

SECTION-C

26. Factorize the polynomial :
    $64a^3 - 27b^3 - 144a^2b + 108ab^2$

27. A traffic signal board, indicating SCHOOL AHEAD is an equilateral triangle with side A. Find the area of the signal board, using Heron's formula. If its perimeter is 180cm, what will be the area of the signal board?
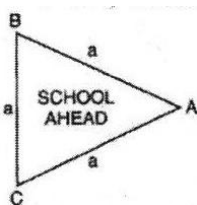
OR

Calculate the area of the shaded region in Fig.
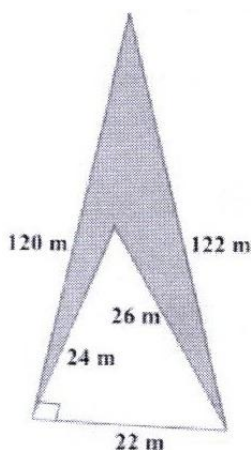
28. Locate $\sqrt{3}$ on the number line.
29. Find solutions of the form x=a,y=o and x=0, y=b for the following pairs of equations. Do they have any common such solutions for equations 9x + 7y = 63 and x+y=10.
30. Find the value of K, if (x-1) is factor of $p(x) = kx^2 - \sqrt{2}x + 1$.
31. In fig. D and E are points on side BC of ΔABC such that BD=CE and AD=AE. Sow that $\Delta ABD \cong \Delta ACE$.
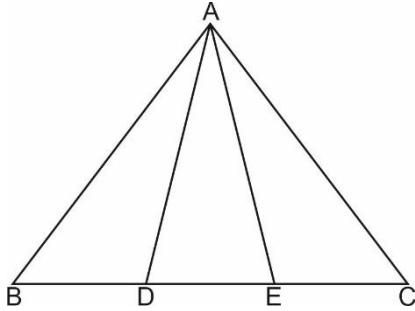
SECTION D
32. Prove that "If two lines intersect each other, then vertically opposite angles are equal".
33. If $a = \frac{\sqrt{2}+1}{\sqrt{2}-1}$ and $a = \frac{\sqrt{2}-1}{\sqrt{2}+1}$, then find the value of $a^2 + b^2$.

OR

Find the values of a and b if $\frac{\sqrt{2}+\sqrt{3}}{3\sqrt{2}-2\sqrt{3}} = a - b\sqrt{6}$

34. In figure $\angle ABC = 65^0, \angle BCE = 30^0, \angle DCE = 35^0$ and $\angle CFE = 145^0$. Prove that AB||FE.
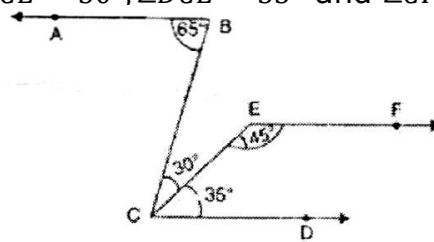
OR

In the given figure, AB||CD and $\angle AOC = x^0$. If $\angle OAB = 104^0$ and $\angle OCD = 116^0$, find the value of x.
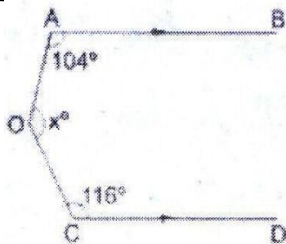
35..The runs scored by two teams A and B on the first 60 balls in a cricket match are given below :

Number of balls	Team A	Team B
1-6	2	5
7-12	1	6
13-18	8	2
19-24	9	10
25-30	4	5
31-36	5	6
37-42	6	3

43-48	10	4
49-54	6	8
55-60	2	10

SECTION E

36. Read the text carefully and answer the questions :

In the Meharali, New DETC bus stop was constructed. The bus stop is barricaded from the remaining part of the road, by using 50 hollow cones. Each hollow cone is made of recycled cardboard.

Each cone has a base diameter of 40 cm and a height of 1 m.
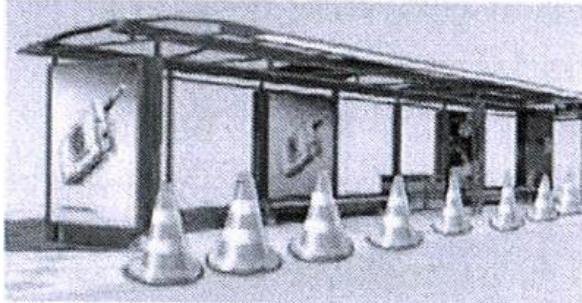
i) Find the curved surface area of the cone.
ii) What is the volume of a cone?

OR

If the cost of cardboard is `100 per m^2 then what will be cost of cardboard for 50 cones?

i) If the outer side of each of the cones is to be painted and the cost of painting is `12 per m^2, what will be the cost of painting all these cones?

37. Child labour refers to any work or activity that deprives children of their childhood. It is a violation of children's rights. This can them mentally or physically. It also exposes them to hazardous situations or stops them from going to school. Naman got data on the number of child labors (in million) in different country that is given below.
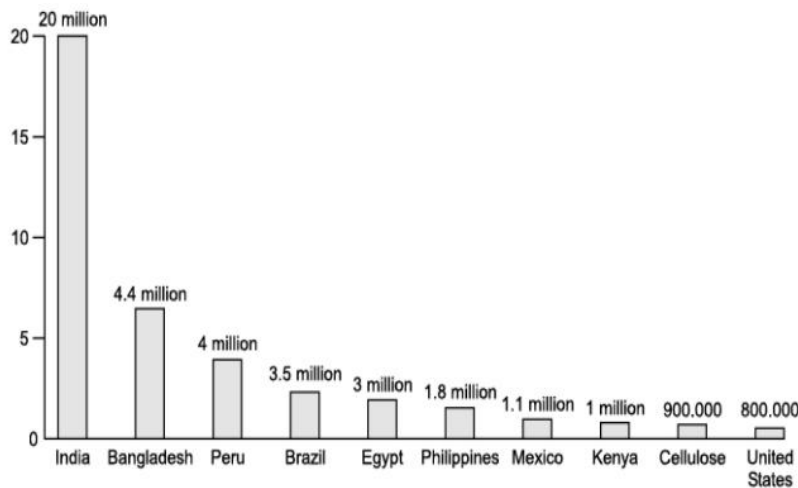

(i) What is the difference between highest no child labor and the minimum no of child labor?
(ii) What is the percentage of no. of child labor in Peru over the no. of child labor in India?
(iii) What is the total no. of child labor in the countries having child labor more than 2 million?

OR

How many countries are having child labor more than Mexico?

38. In a forest, a big tree got broken due to heavy rain and wind. Due to this rain the big branches AB and AC with lengths 5m fell down on the ground. Branch AC

makes an angle of 30° with the main tree AP. The distance of Point B from P is 4 m. You can observe that ΔABP is congruent to ΔACP.
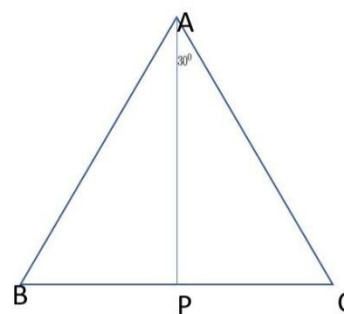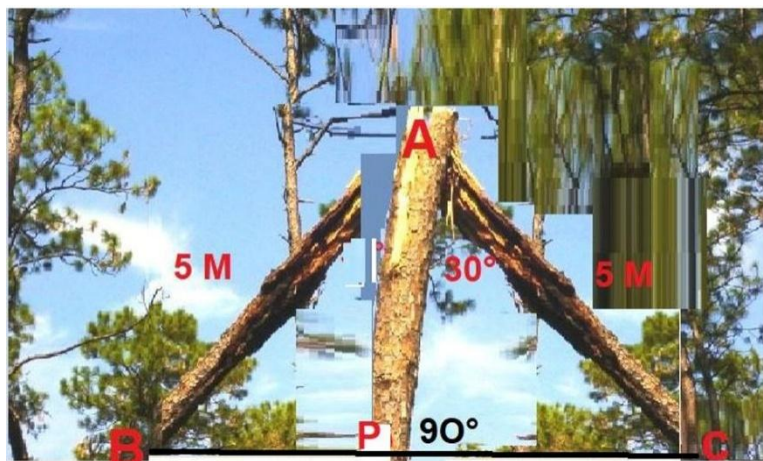
(i)   Show that ΔACP and ΔABP are congruent.
(ii)   Find the value of ∠ACP?
(iii) Find the value of ∠BAP?

OR

What is the total height of the tree?