Time Allowed: 3 Hrs   **Maximum Marks: 80**

General Instructions:
1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
4. Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.
5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.
6. Section E has 3 sourced based/Case Based/passage based/integrated units of assessment (4 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 2 marks, 2 Qs of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take π =22/7 wherever required if not Stated.

SECTION A
Q 1-20 are multiple choice questions. Each question is of 1 mark.

1. If the decimal representation of a number is non-terminating, non-repeating then the number is:

   a. a natural number   b. a rational number
   c. a whole number   d. an irrational number

2. If the perimeter of an equilateral triangle is 180 cm. Then its area will be:
   a. 900 cm^2 b. 900√3 cm^2
   c. 300√3 cm^2 d. 600√3 cm^2

3. Find the value of k, if **(3,0)** is a solution of the equation 2x + 3y = k.

   a. 5   b. 6
   c. 7   d. 8

4. In the figure, O is the centre of the circle. What is the measure of ∠ADC?
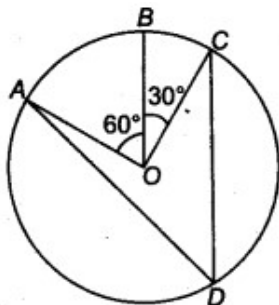
   a. 120   b. 90°
   c. 45°   d.110°

5. Total surface area of a hemisphere is 4158cm^2, the diameter of the hemisphere is equal to _____ cm.

   a. 40   b. 20

   c. 21   d. 42

**6.** The number of zeros of the polynomial $x^2 + 4x + 2$ is/are:

   a. 1   b. 2

   c. 3   d. 4

7. A spherical balloon's radius increases to 3 times when the air is pumped in it. If the surface area of the balloon after pumping the air is A_2 and its surface area before pumping the air is A_1, then what is the value of A1:A2?

   a. 1:3   b. 9:1

   c. 27:1   d. 1:9

8. In the given figure, if the angles a and b are in the ratio 2: 3, then angle c is:
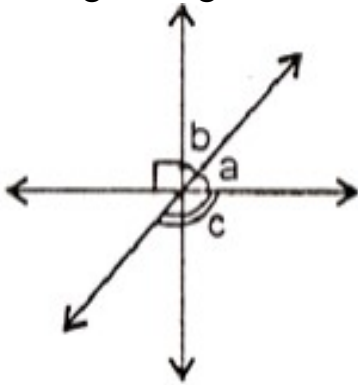
   a.90°   b.126°

   c.144°   d.160°

9. The angles that share a common vertex and a common side are called

   a. Supplementary angles   b. Complementary angles

   c. Adjacent angles   d. Vertical angles

10. The cost of levelling a triangular field having sides 325m, 300m and 125 m at the rate of ₹2 per m^2 is:

   a. ₹ 37500   b. ₹ 38000

   c. ₹36000   d.37000

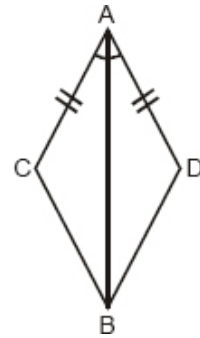**11.** Which of these statements do not satisfy Euclid's axiom?

a. Things which are equal to the same thing are equal to one another

b. If equals are added to equals, the wholes are equal.

c. If equals are subtracted from equals, the remainders are equal.

d. The whole is lesser than the part.

12. In the given figure, the congruency rule used in proving

∠ACD ≅ ∠ADB is

    a.ASA   b. SAS

    c.AAS   d. RHS

13. If the diagonals of a quadrilateral bisect each other, then the quadrilateral is a:
    a. Parallelogram   b. Rectangle
    c. Rhombus   d. Square

14. Screen size is defined by the distance between two diagonally opposite corners of a screen. A manufacturer can make rectangular display screens as per clients' demands. A client purchased a display screen of size $\sqrt{70}$ units from the manufacturer last year. For an upgrade, he wants the same type of screen with a larger display

The new screen size must be more than double, but it should be less than three times that of the existing one. Which of the following screen sizes meets the client's requirement?

    a$\sqrt{145}$ units   b. $\sqrt{175}$ units
    c. $2\sqrt{70}$ units   d. $\sqrt{580}$ units cm

15. The height of a conical cap is 16cm and its base radius is12cm.Its slant height is:

    a. 14cm   b. 20cm
    c. 10cm   d. 15cm

16. Which of the following is a linear polynomial?
    a. $7x^2+\sqrt{2}$ b.$5x^3+ 8x$
    c. $-2x + 5$ d. $2y^4$

17. The class mark of the interval 100-110 is:
    a. 104   b. 105
    c. 90   d. 115

18. The base of an isosceles right triangle is 30cm .Its area is:

a. 225 cm^2 b. $225\sqrt{3}$ cm^2

c. 225 $\sqrt{2}$cm^2 d. 450 cm^2

19. **Assertion**: If a=35^0, b=145^0 then the angles a and b form a linear pair of angles.
    Reason: the sum of a linear pair of angles is always 180^0
   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.

20. **Assertion:** If x=1 is zero of polynomial 2x^2+kx-12, then k =10

    Reason: If x=a is zero of polynomial f(x) ,then f(-a) =0.

   a. Both Assertion and Reason are correct and Reason is the correct explanation for Assertion
   b. Both Assertion and Reason are correct and Reason is not the correct explanation for
      Assertion.
   c. Assertion is true but the reason is false.
   d. Both assertion and reason are false.

SECTION B
Section –B consists of 5 questions of 2 marks each.

21. In Fig. POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that ∠ ROS = 1/2 (∠ QOS – ∠ POS)
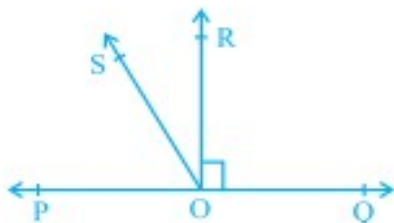
22.The angles of a quadrilateral are in the ratio 3:4:5:6. Find all the angles of the quadrilateral.

OR

Show that opposite angles of a parallelogram are equal.

23. Solve the equation x-10=15, state which axiom you use here.
.

OR

Write Euclid's third postulate.

24. The following is the height (in cm) of ten boys:

145, 115, 129, 135, 139, 158, 170, 175, 188, 163

Make a frequency distribution table by using the following class interval:

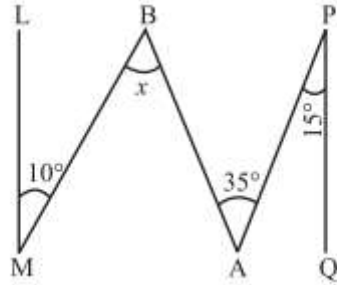100 – 120, 120 – 140, 140 – 160, 160 – 180, 180 – 200.

25. Prove that if chords of congruent circles subtend equal angles at their centres, then the chords are equal.

SECTION- C
Section –C consists of 6 questions of 3 marks each.

26. Rationalize the denominator: $\dfrac{1}{3+\sqrt{3}+\sqrt{2}}$

27. In the given figure QP∥ ML .Find the value of x.

OR

Prove that the bisectors of the angles of a linear pair form a right angle.

.

28. An isosceles triangle has perimeter 30 cm and each of the equal sides is 12 cm. Find the area of the triangle

29. 100 surnames were randomly picked up from a local telephone directory and a frequency distribution of the number of letters in the English alphabet in the surnames was found as follows

Number of letters	Number of surnames
1 - 4	6
4 - 6	30
6 - 8	44
8 - 12	16
12 - 20	4

 Draw a histogram to depict the given information.

30.If (3,0) is the solution of the equation x+4y =k then find the value of k .Also find two more solutions.
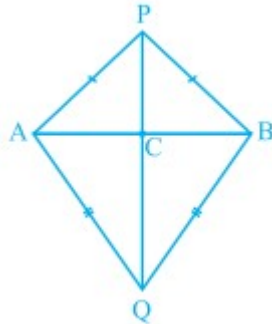
31. Simplify: $(2x -5y)^3 - (2x +5y)^3$

OR

If x= $\dfrac{3+\sqrt{5}}{2}$ then find the value of $x^2 + \dfrac{1}{x^2}$

Section – D consists of 4 questions of 5 marks each.

32. AB is a line-segment. P and Q are points on opposite sides of AB such that each of them is equidistant from the points A and B (see Fig.). Show that the line PQ is the perpendicular bisector of AB.

OR

AD is an altitude of an isosceles triangle ABC in which AB = AC. Show that

 (i) AD bisects BC   (ii) AD bisects ∠ A.

33. If $x = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ and $y = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$, then find the value of $x^2 + y^2 + xy$

34. Abhilasha participates in Diwali Mela with her friends for the charity to centre of handicapped children. They donate ₹ 3600 to the centre from the amount earned in Mela. If each girl donates ₹150 and each boy donates ₹ 200.

 (a) Form the linear equation in two variables.
 (b) If number of girls are 8, find number of boys.
                                    OR
 Write 3y = 8x in the form of ax +by = c .Also find the values of a, b and c and two solutions
  of the equation. How many solutions can you find out?

**35**. If $\frac{x}{y} + \frac{y}{x} = -1$ where x ≠ 0, y ≠ 0 then find the value of $x^3 - y^3$

SECTION -E
Case study Based questions are compulsory.

36. Students of class IX visit a stadium.Teacher assign them an activity to observe the seatiing arrangement between the various sudents and the speaker based on coordinate geometry.The students were surprised when teacher asked them you need to apply coordinate geometry on the seating arrangement of sudents and the speaker
Based on the above information answer the following questions:
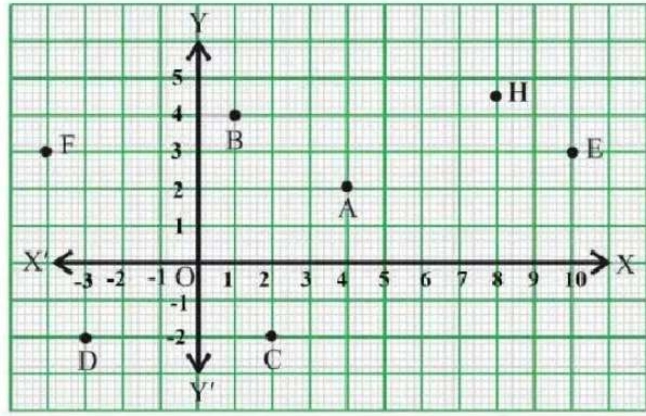
i) Find the perpendicular distance of the point from the y-axis. 1
(ii) In which quadrant, the point 'D' lies? 1
(iii) Write the coordinates of the mirror image of point B across x -axis? 2

OR

Write the abscissa of the point B and ordinate of the point C.

37. Avicii Arena, formerly the Ericsson Globe, has since it's inauguration in 1989 been one of Stockholm's most iconic buildings. With a volume of 605 000 cubic meters (approximately 2 136 540 cubic feet), this is the world's largest spherical building. The arena serves as Sweden's national hockey arena but also hosts a variety of other events and concerts. The arena is regarded as one of the best in the world, and has created one of the most famous skyline silhouettes in Stockholm. With a diameter of 110 metres, the arena is the world's largest globe-shaped building.
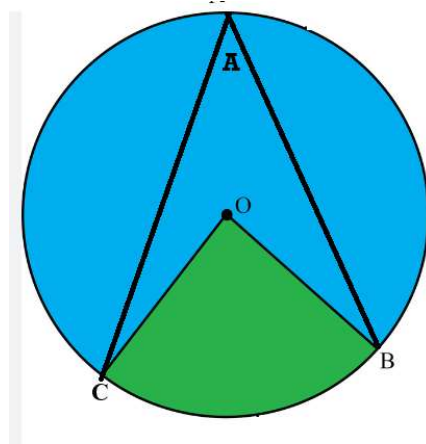

Based on the above information answer the following questions:
i) What is the area of circle of the base of spherical structure? 1
ii) If the radius of hemisphere is halved then what will be the ratio of surface areas in these two cases. 1
iii) Calculate the volume of the spherical dome if the height of the dome is 21 m 2

OR

Find the cloth require to cover the hemispherical dome if the radius of its base is 90 m

38.Aditi wants to draw some figures on coloured pages for Diwali decoration so she opens compass of 7cm and draws a circle with centre O .she wants to pin some decoration accessory at the centre O and at any point A on the circle, She takes two points B and C on the circle and joins them with O and A respectively as shown in the figure.

Based on the above information answer the following questions:

i) Name the figure formed by joining points B and C with O. 1

ii) Find the length of diameter of the circle. 1

iii) If $\angle BOC$ is $(2a+60)^0$ and $\angle BAC =60^0$ then find the value of a. 2

OR

What will be the value of reflex $\angle BOC$ and $\angle BAC$ if $\angle BOC$ is 70^0