General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper comprises* ***four*** *sections – A, B, C and D. This question paper carries* ***40*** *questions. All questions are* ***compulsory****.*

(ii) ***Section A*** *: Question Numbers* ***1*** *to* ***20*** *comprises of* ***20*** *questions of* ***one*** *mark each.*

(iii) ***Section B*** *: Question Numbers* ***21*** *to* ***26*** *comprises of* ***6*** *questions of* ***two*** *marks each.*

(iv) ***Section C*** *: Question Numbers* ***27*** *to* ***34*** *comprises of* ***8*** *questions of* ***three*** *marks each.*

(v) ***Section D*** *: Question Numbers* ***35*** *to* ***40*** *comprises of* ***6*** *questions of* ***four*** *marks each.*

(vi) *There is no overall choice in the question paper. However, an internal choice has been provided in 2 questions of one mark, 2 questions of two marks, 3 questions of three marks and 3 questions of four marks. You have to attempt only one of the choices in such questions.*

(vii) *In addition to this, separate instructions are given with each section and question, wherever necessary.*

(viii) *Use of calculators is* ***not*** *permitted.*

SECTION A

Question numbers 1 to 20 carry 1 mark each.

Question numbers 1 to 10 are multiple choice questions.

Choose the correct option.

1. The value(s) of k for which the quadratic equation $2x^2 + kx + 2 = 0$ has equal roots, is

(A) 4

(B) ± 4

(C) -4

(D) 0

2. Which of the following is ***not*** an A.P. ?

(A) $-1{\cdot}2, 0{\cdot}8, 2{\cdot}8, \ldots$

(B) $3, 3+\sqrt{2}, 3+2\sqrt{2}, 3+3\sqrt{2}, \ldots$

(C) $\frac{4}{3}, \frac{7}{3}, \frac{9}{3}, \frac{12}{3}, \ldots$

(D) $\frac{-1}{5}, \frac{-2}{5}, \frac{-3}{5}, \ldots$

3. In Figure-1, from an external point P, two tangents PQ and PR are drawn to a circle of radius 4 cm with centre O. If $\angle QPR = 90°$, then length of PQ is

(A) 3 cm

(B) 4 cm

(C) 2 cm

(D) $2\sqrt{2}$ cm

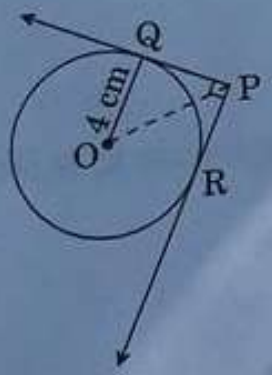

Figure-1

4. The distance between the points $(m, -n)$ and $(-m, n)$ is

(A) $\sqrt{m^2+n^2}$

(B) $m+n$

(C) $2\sqrt{m^2+n^2}$

(D) $\sqrt{2m^2+2n^2}$

P.T.O.

5. The degree of polynomial having zeroes – 3 and 4 only is

(A) 2

(B) 1

(C) more than 3

(D) 3

6. In Figure-2, ABC is an isosceles triangle, right-angled at C. Therefore

(A) $AB^2 = 2AC^2$

(B) $BC^2 = 2AB^2$

(C) $AC^2 = 2AB^2$

(D) $AB^2 = 4AC^2$

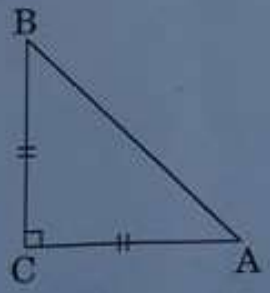

Figure-2

7. The point on the x-axis which is equidistant from (– 4, 0) and (10, 0) is

(A) (7, 0)

(B) (5, 0)

(C) (0, 0)

(D) (3, 0)

OR

The centre of a circle whose end points of a diameter are (– 6, 3) and (6, 4) is

(A) (8, – 1)

(B) (4, 7)

(C) $\left(0, \frac{7}{2}\right)$

(D) $\left(4, \frac{7}{2}\right)$

8. The pair of linear equations

$$\frac{3x}{2} + \frac{5y}{3} = 7 \text{ and } 9x + 10y = 14 \text{ is}$$

(A) consistent

(B) inconsistent

(C) consistent with one solution

(D) consistent with many solutions

9. In Figure-3, PQ is tangent to the circle with centre at O, at the point B. If $\angle AOB = 100°$, then $\angle ABP$ is equal to

(A) 50°

(B) 40°

(C) 60°

(D) 80°

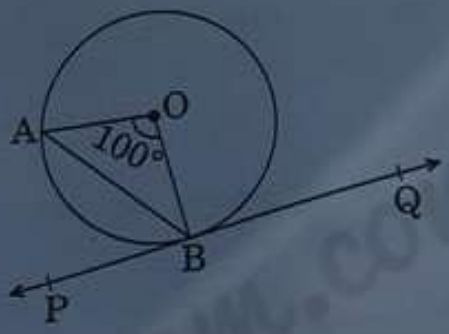

Figure-3

10. The radius of a sphere (in cm) whose volume is 12π cm^3, is

(A) 3

(B) $3\sqrt{3}$

(C) $3^{2/3}$

(D) $3^{1/3}$

Fill in the blanks in question numbers 11 to 15.

11. AOBC is a rectangle whose three vertices are A(0, – 3), O(0, 0) and B(4, 0). The length of its diagonal is _____ .

12. In the formula $\bar{x} = a + \left(\frac{\Sigma f_i u_i}{\Sigma f_i}\right) \times h$, $u_i =$ _____ .

13. All concentric circles are _____ to each other.

14. The probability of an event that is sure to happen, is _____ .

15. Simplest form of $(1 - \cos^2 A)(1 + \cot^2 A)$ is _____ .

Answer the following question numbers 16 to 20.

16. The LCM of two numbers is 182 and their HCF is 13. If one of the numbers is 26, find the other.

17. Form a quadratic polynomial, the sum and product of whose zeroes are (– 3) and 2 respectively.

OR

Can $(x^2 - 1)$ be a remainder while dividing $x^4 - 3x^2 + 5x - 9$ by $(x^2 + 3)$? Justify your answer with reasons.

18. Find the sum of the first 100 natural numbers.

19. Evaluate :

$2 \sec 30° \times \tan 60°$

20. In Figure-4, the angle of elevation of the top of a tower from a point C on the ground, which is 30 m away from the foot of the tower, is 30°. Find the height of the tower.

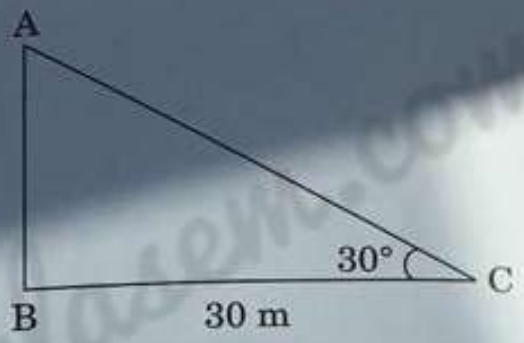

Figure-4

SECTION B

Question numbers 21 to 26 carry 2 marks each.

21. Find the mode of the following distribution :

Marks :	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Number of Students :	4	6	7	12	5	6

22. In Figure-5, a quadrilateral ABCD is drawn to circumscribe a circle. Prove that

$$AB + CD = BC + AD.$$

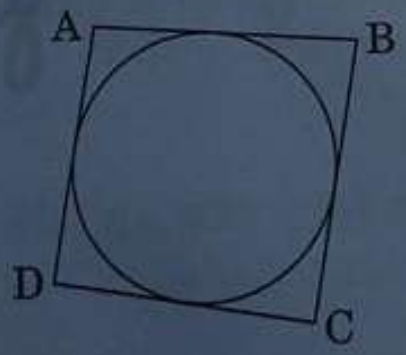

Figure-5

OR

In Figure-6, find the perimeter of ΔABC, if AP = 12 cm.

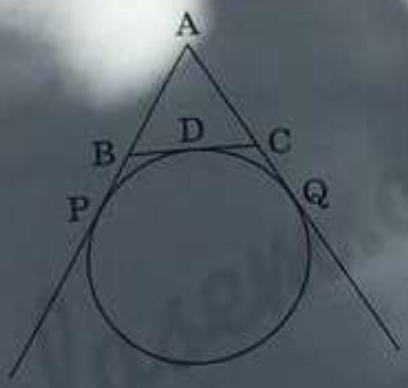

Figure-6

23. How many cubes of side 2 cm can be made from a solid cube of side 10 cm ?

24. In the given Figure-7, DE ∥ AC and DF ∥ AE.

Prove that $\frac{BF}{FE} = \frac{BE}{EC}$.

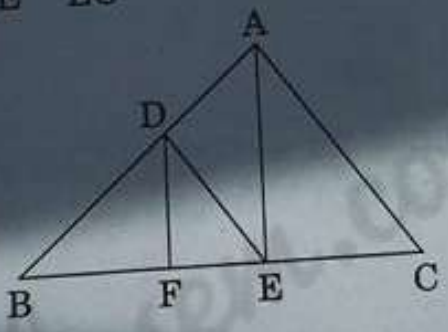

Figure-7

25. Show that $5 + 2\sqrt{7}$ is an irrational number, where $\sqrt{7}$ is given to be an irrational number.

OR

Check whether 12^n can end with the digit 0 for any natural number n.

26. If A, B and C are interior angles of a ΔABC, then show that

$$\cot\left(\frac{B+C}{2}\right) = \tan\left(\frac{A}{2}\right).$$

P.T.O.

SECTION C

Question numbers 27 to 34 carry 3 marks each.

27. In Figure-8, a square OPQR is inscribed in a quadrant OAQB of a circle. If the radius of circle is $6\sqrt{2}$ cm, find the area of the shaded region.

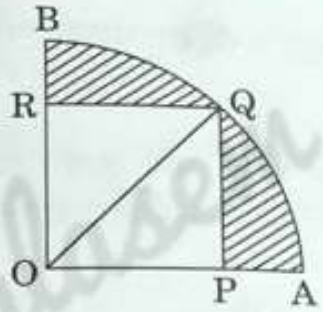

Figure-8

28. Construct a Δ ABC with sides BC = 6 cm, AB = 5 cm and $\angle$ ABC = 60°. Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of Δ ABC.

OR

Draw a circle of radius 3·5 cm. Take a point P outside the circle at a distance of 7 cm from the centre of the circle and construct a pair of tangents to the circle from that point.

29. Prove that :

$$\frac{2\cos^3\theta - \cos\theta}{\sin\theta - 2\sin^3\theta} = \cot\theta$$

30. A fraction becomes $\frac{1}{3}$ when 1 is subtracted from the numerator and it becomes $\frac{1}{4}$ when 8 is added to its denominator. Find the fraction.

OR

The present age of a father is three years more than three times the age of his son. Three years hence the father's age will be 10 years more than twice the age of the son. Determine their present ages.

P.T.O.

31. Using Euclid's Algorithm, find the largest number which divides 870 and 258 leaving remainder 3 in each case.

32. Find the ratio in which the y-axis divides the line segment joining the points $(6, -4)$ and $(-2, -7)$. Also find the point of intersection.

OR

Show that the points (7, 10), $(-2, 5)$ and $(3, -4)$ are vertices of an isosceles right triangle.

33. In an A.P. given that the first term (a) = 54, the common difference (d) = -3 and the n^{th} term $(a_n) = 0$, find n and the sum of first n terms (S_n) of the A.P.

34. Read the following passage and answer the questions given at the end :

Diwali Fair

A game in a booth at a Diwali Fair involves using a spinner first. Then, if the spinner stops on an even number, the player is allowed to pick a marble from a bag. The spinner and the marbles in the bag are represented in Figure-9.

Prizes are given, when a black marble is picked. Shweta plays the game once.

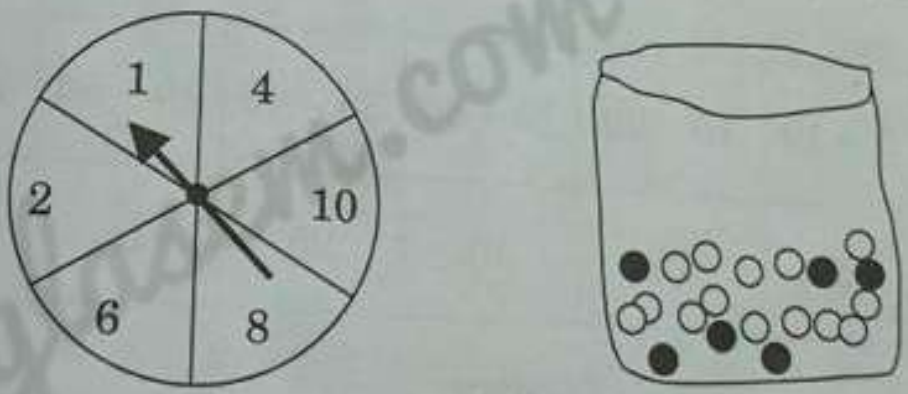

Figure-9

(i) What is the probability that she will be allowed to pick a marble from the bag ?

(ii) Suppose she is allowed to pick a marble from the bag, what is the probability of getting a prize, when it is given that the bag contains 20 balls out of which 6 are black ?

SECTION D

Question numbers 35 to 40 carry 4 marks each.

35. Sum of the areas of two squares is 544 m^2. If the difference of their perimeters is 32 m, find the sides of the two squares.

OR

A motorboat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

36. A solid toy is in the form of a hemisphere surmounted by a right circular cone of same radius. The height of the cone is 10 cm and the radius of the base is 7 cm. Determine the volume of the toy. Also find the area of the coloured sheet required to cover the toy. (Use $\pi = \frac{22}{7}$ and $\sqrt{149} = 12{\cdot}2$)

37. For the following data, draw a 'less than' ogive and hence find the median of the distribution.

Age (in years) :	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Number of persons :	5	15	20	25	15	11	9

OR

The distribution given below shows the number of wickets taken by bowlers in one-day cricket matches. Find the mean and the median of the number of wickets taken.

Number of wickets :	20 – 60	60 – 100	100 – 140	140 – 180	180 – 220	220 – 260
Number of bowlers :	7	5	16	12	2	3

38. From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower. (Use $\sqrt{3} = 1{\cdot}73$)

39. Prove that in a right-angled triangle, the square of the hypotenuse is equal to the sum of the squares of other two sides.

40. Obtain other zeroes of the polynomial

$$p(x) = 2x^4 - x^3 - 11x^2 + 5x + 5$$

if two of its zeroes are $\sqrt{5}$ and $-\sqrt{5}$.

OR

What minimum must be added to $2x^3 - 3x^2 + 6x + 7$ so that the resulting polynomial will be divisible by $x^2 - 4x + 8$?