This question paper has 5 sections A-E.

Section A has 20 MCQs carrying 1 mark each.

Section B has 5 questions carrying 02 marks each.

Section C has 6 questions carrying 03 marks each.

Section D has 4 questions carrying 05 marks each.

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.

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 been provided in the 2 marks questions of Section E.

Draw neat figures wherever required.Take $\pi = 22/7$ wherever required if not stated.

SECTION A(20 X 1 =20)

1. HCF (16,y) =8 and LCM (16,y) =48 then the value of y is

a) 24   b) 16   c) 8   d) 48

2. Which of these numbers always ends with the digits 6

a) 4^n b) 2^n c) 6^n d) 8^n

3. The pair of linear equations 2x+3y=5 and 4x+6y=10 is

a) inconsistent   b) consistent   c) unique solution   d) none of these

4. The quadratic polynomial whose sum of zeros is 3 and product of zeros is -2 is

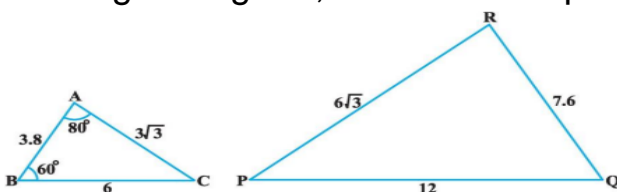a) x^2+3x-2 b) x^2-2x+3 c) x^2-3x+2 d) x^2-3x-2

5. The first terms of an AP is p and the common difference is q, then its 10th terms is

   a) q+9p   b) p-9q   c) p+9q   d) 2p+9q

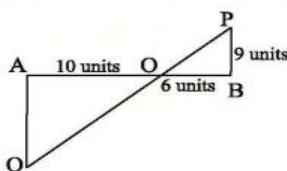6. The 4th terms from the end of the AP : -11, -8, -5, … , 49 is

   a) 37   b) 40   c) 43   d) 58

7. In the given figure , the value of ∠p is

   a) 60^0 b) 80^0 c) 40^0 d) 100^0

8. In the following figure QA ⊥ AB and PB ⊥ AB, then AQ is

a) 15 units	b) 8 units	c) 5 units	d) 9 units

9. If in two triangles ABC and DEF , ∠A=∠E , ∠B = ∠F , then which of the following is not true ?

a) $\frac{BC}{DF} = \frac{AC}{DE}$	b) $\frac{AB}{DE} = \frac{BC}{DF}$	c) $\frac{AB}{EF} = \frac{AC}{DE}$	d) $\frac{BC}{DF} = \frac{AB}{EF}$

10. If in triangle ABC, AD is the bisector of ∠BAC. If AB =6cm, AC= 5cm and BD = 3cm , then Dc

a) 11.3 cm	b) 2.5cm	c) 3.5cm	d) none of these

11. If the vertices of a parallelogram PQRS taken in order are P(3,4) , Q(-2,3) and R(-3,-2) then the coordinates of its fourth vertex is

a) (-2,-1)	b) (-2,-3)	c) (2,-1)	d) (1,2)

12. The line segment joining points (-3,-4) and (1,-2) is divided by y axis in the ratio

a) 1:3	b) 2:3	c) 3:2	d) 3:1

13. If P($\frac{a}{3}$, 4) is the mid-point of the line segment joining the points Q(-6,5) and R(-2,3) then the value of a is

a) -4	b) -12	c) 12	d) -6

14. The point which divides the line segment joining the points (7,-6) and (3,4) in the ration 1:2 internally lies in the

a) I quadrant	b) II quadrant	c) III quadrant	d) IV quadrant

15. If cosec θ-cot θ= $\frac{1}{2}$, the value of cosec θ+cot θ is
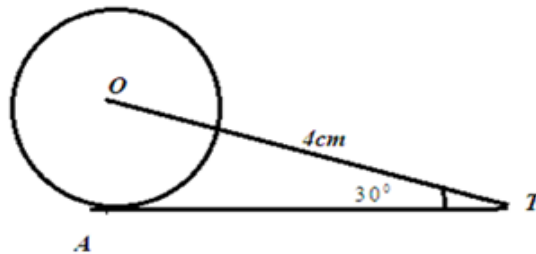
a) 1	b) 2	c) 3	d) 4

16. If sin θ+sin^2 θ=1 then cos^2 θ+ cos^4 θ is equal to

a) -1	b) 1	c) 0	d) none of these

17. If the angle between two tangents drawn from a point P to a circle of radius 'a' and centre 'o' is 90^0 , then OP is

a) 2a$\sqrt{2}$	b) a$\sqrt{2}$	c) $\frac{a}{\sqrt{2}}$	d) 5a$\sqrt{2}$

18. In the following figure, AT is a tangent to the circle with centre O such that OT = 4 cm and ∠OTA = 30°. Then AT is equal to

a) 4 cm	b) 2 cm	c) 2$\sqrt{3}$ cm	d) 4$\sqrt{3}$ cm

19. Assertion : There is no tangent to a circle passing through a point lying inside the circle.

Reason : Tangent intersects the circle at only one point

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 and R is true.

20. Assertion : If nth term of an A.P. is 6-2n, then its common difference is -2 .

Reason : Common difference of an A.P. is given by d= $a_n - a_{n-1}$.

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 and R is true.
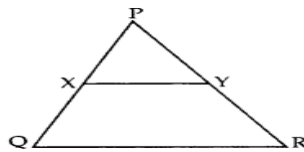
SECTION B (5 X 2 =10)

21. Prove that $\sqrt{3}$ is an irrational number.
22. If the nth term of the A.P. -1, 4,9,14 ,… is 129. Find the value of n.
23. In an equilateral triangle of side 2a , find the length of the altitude.

(or)

In the given figure , XY is parallel to QR , $\frac{PQ}{XQ} = \frac{7}{3}$ and PR =6.3cm , find YR.

24. The co ordinates of the points P and Q are respectively (4,-3) and (-1,7).
Find the abscissa of a point R on the line segment PQ such that
$\frac{PR}{PQ} = \frac{3}{5}$

(or)

Given 15cotA = 8, find SinA and SecA.
25. If two tangents inclined at an angle 60^0 are drawn to a circle of radius 3cm then find the length of each tangents.

SECTION C (6 X 3 =18)

26. A fraction becomes $\frac{1}{3}$ when 2 is subtracted from the numerator and it

becomes $\frac{1}{2}$ when 1 is subtracted from the denominator. Find the fraction.
27. Find the middle term of A.P. 7,13,19,… 247.

(or)

The ninth term of an A.P. is equal to seven times the second term and twelfth term exceeds five times the third term by 2. Find the first term and the common difference.
28. Find the ratio in which the point (-3,p) divides the line segment joining the points (-5,-4) and (-2,3). Hence , find the value of p.
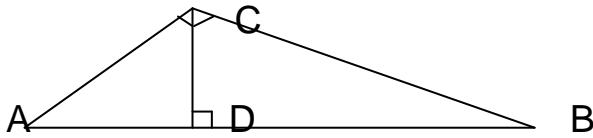
29. Prove that $2(\cos^2 45^0 + \tan^2 60^0) - 6(\sin^2 45^0 - \tan^2 30^0) = 6$

(or)

If $\sin A + \cos A = \sqrt{2}$, prove that $\tan A + \cot A = 2$

30. In Figure, $\angle ACB = 90°$ and CD is perpendicular to AB, prove that $CD^2 = BD \times AD$.
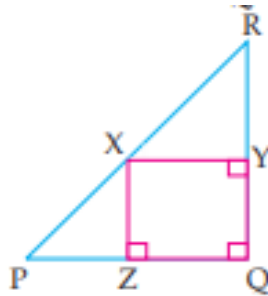

31. PQ is a chord of length 8cm of a circle of radius 5cm. The tangents at P and Q intersect at a point T. Find the length TP.

SECTION D (4 X 5 =20)

32. a) Triangle PQR is right angled at Q. $QX \perp PR$, $XY \perp RQ$ and $XZ \perp PQ$ are drawn. Prove that $XZ^2 = PZ \times ZQ$.


(or)

b) Prove that If a line is drawn parallel to one side of a triangle intersecting the other two sides in distinct points, then the other two sides are divided in the same ratio.

33. If the point A (2, -4) is equidistant from P (3, 8) and Q (-10, y), find the values of y. Also find distance PQ.

34. In Fig. O is the centre of a circle of radius 5 cm. T is a point such that OT = 13 cm and OT intersects circle at E. If AB is a tangent to the circle at E, find the length of AB, where TP and TQ are two tangents to the circle.
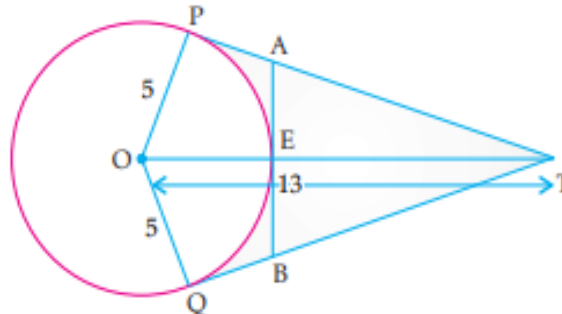
35. a) Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

(or)

b) (i) Prove that $\dfrac{1+\cos\theta - \sin^2\theta}{\sin\theta\,(1+\cos\theta)} = \cot\theta$

(ii) Prove that $\dfrac{1}{cosA+sinA-1} + \dfrac{1}{cosA+sinA+1} = cosecA+secA$

SECTION E (3 X 4 =12)

36. Vijay is trying to find the average height of a tower near his house. He is using the properties of similar triangles. The height of Vijay's house if 20 m when Vijay's house casts a shadow 10 m long on the ground. At the same time, the tower casts a shadow 50 m long on the ground and the house of Ajay casts 20 m shadow on the ground.

Vijay's House   Tower   Ajay's House

a) What is the height of the tower?

   (a) 20 m   (b) 50 m   (c) 100 m   (d) 200 m

b) What will be the length of the shadow of the tower when Vijay's house
   casts a shadow of 12 m?

   (a) 75 m   (b) 50 m   (c) 45 m   (d) 60 m

c) (i) What is the height of Ajay's house?

   (a) 30 m   (b) 40 m   (c) 50 m   (d) 20 m

                     (or)

(ii) When the tower casts a shadow of 40 m, same time what will be the
    length of the shadow of Ajay's house?

   (a) 16 m   (b) 32 m   (c) 20 m   (d) 8 m

37. There is a circular filed of radius 5 m. Kanabh, Chikoo and Shubhi are playing with ball, in which Kanabh and Chikoo are standing on the boundary of the circle. The distance between Kanabh and Chikoo is 8 m. From Shubhi point S, two tangents are drawn as shown in the figure. Give the answer of the following questions.
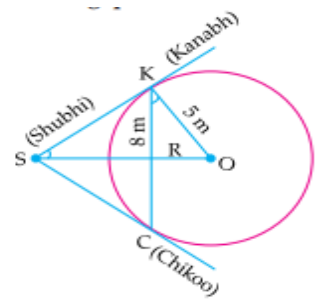
a) What is the relation between the lengths of SK and SC ?

   (a) SK ≠ SC   (b) SK = SC   (c) SK > SC   (d) SK < SC.

b) The length (distance) of OR is:

   (a) 3 m   (b) 4 m   (c) 5 m   (d) 6 m.

c) (i) The sum of angles SKR and OKR is:

   (a) 45°   (b) 30°   (c) 90°   (d) none of these

(ii) The distance between Kanabh and Shubhi is:

(a) $\frac{10}{3}$ m (b) $\frac{13}{3}$ m (c) $\frac{16}{3}$ m (d) $\frac{20}{3}$ m

38. A Ferris wheel (or a big wheel in the United Kingdom) is an amusement ride consisting of a rotating upright wheel with multiple passenger-carrying components (commonly referred to as passenger cars, cabins, tubs, capsules, gondolas, or pods) attached to the rim in such a way that as the wheel turns, they are kept upright, usually by gravity. After taking a ride in Ferris wheel, Aarti came out from the crowd and was observing her friends who were enjoying the ride . She was curious about the different angles and measures that the wheel will form. She forms the figure as given below.
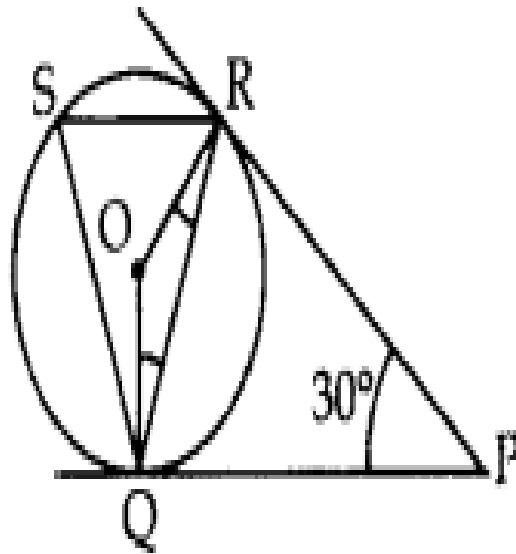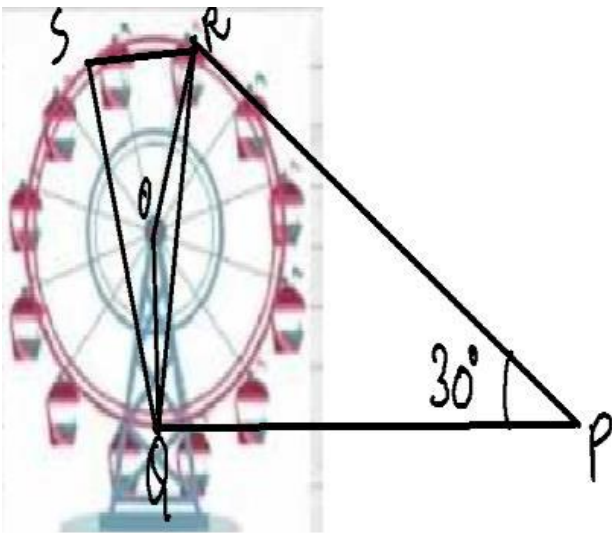
a) In the given figure find ∠ROQ

   a) 60 b) 100 c) 150 d) 90

b) Find ∠RQP

   a) 75 b) 60 c) 30 d) 90

c) (i) Find ∠RSQ

   a) 60 b) 75 c) 100 d) 30

(or)

(ii) Find ∠ORP

   a) 90 b) 70 c) 100 d) 60