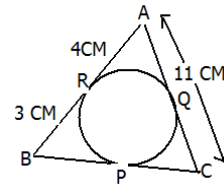


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SECTION A

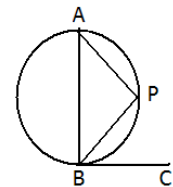
- Q1. If the area of a circle is  $301.84 \text{ cm}^2$ , then its circumference is  
 (a) 4.6cm (b) 9.8cm (c) 61.6cm (d) 59.4cm
- Q2. A letter is chosen at random from the word "PROBABILITY". The probability that it is a vowel is  
 (a)  $1/11$  (b)  $2/11$  (c)  $3/11$  (d)  $4/11$
- Q3. If the length of a shadow cast by a pole is 3 times the length of the pole, then the angle of elevation of the sun is  
 (a)  $45^\circ$  (b)  $30^\circ$  (c)  $60^\circ$  (d)  $90^\circ$
- Q4. The mid-point of the line segment joining  $P(-2,8)$  and  $Q(-6,-4)$  is  
 (a)  $(-4,2)$  (b)  $(4,2)$  (c)  $(4,-2)$  (d)  $(-4,-2)$



- Q5. In given figure, the length of BC is  
 (a) 4 units (b) 6 units (c) 8 units (d) 10 units
- Q6. A spherical steel ball is melted to make 8 new identical balls. Then the radius of each new ball is how much times the radius of the original ball?  
 (a)  $1/2$  (b)  $1/3$  (c)  $1/4$  (d)  $1/8$
7. If  $1/2$  is a root of the equation  $x^2 + kx - 5/4 = 0$ , then the other root of the quadratic equation is  
 (a)  $-5/2$  (b)  $-2$  (c)  $1/4$  (d)  $1/2$
- Q8. If the sum of n terms of an AP is  $3n^2 + n$  and its common difference is 6, then its first term is  
 (a) 2 (b) 3 (c) 1 (d) 4
- Q9. The condition that the point  $(x,y)$  may lie on the line joining  $(3,4)$  and  $(-5,-6)$  is  
 (a)  $5x - 4y + 1 = 0$  (b)  $5x + 4y + 1 = 0$  (c)  $-5x + 4y + 1 = 0$  (d)  $-5x - 4y + 1 = 0$
- Q10. A largest sphere is carved out of a cube of side 7cm. The volume of the sphere is  
 (a)  $179.67 \text{ cu.cm}$  (b)  $180.5 \text{ cu.cm}$  (c)  $182 \text{ cu.cm}$  (d)  $176.42 \text{ cu.cm}$

SECTION B

- Q11. Find the roots of the equation  $6x^2 - \sqrt{2}x - 2 = 0$  by the factorization of the corresponding quadratic polynomial.
- Q12. AB is the chord of circle with centre O, BC is the tangent at B as shown in the given figure. Show that  $\angle PBC = \angle BAP$ .
- Q13. What is the probability that a number selected from the numbers  $1, 2, 3, \dots, 25$  is a prime number, when each of the given numbers is equally likely to be selected? **OR,**



- Two dice are thrown simultaneously. Find the probability of getting an even number as the sum.
- Q14. Find the sum of the first 20 terms of the AP:  $-6, 0, 6, 12, \dots$
- Q15. If  $a, b, c$  are the lengths of the sides of a right triangle, where  $c$  is the hypotenuse, then prove that the radius,  $r$ , of the circle which touches the sides of the triangle is given by  $r = (a + b - c) / 2$
- Q16. Find the area of triangle whose vertices are  $(2,3), (-1,0)$  and  $(2,-4)$ .
- Q17. A wheel has diameter 84cm. Find how many complete revolutions it must make to cover a distance of 792 metres?

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Q18. An umbrella has 10 ribs which are equally spaced. Assuming umbrella to be a flat circle of radius 40 cm, find the area between the two consecutive ribs of the umbrella.

**SECTION C**

Q19. Check whether the equation  $6x^2 - 7x + 2 = 0$  has real roots, and if it has, find them by the method of completing the squares. OR

For what value(s) of k, will the equation  $4x^2 - 2(k+1)x + (k+4) = 0$  have repeated roots?

Q20. Two unbiased coins are tossed. Calculate the probability of getting

- (i) Exactly two heads (ii) At least two tails (iii) No tail

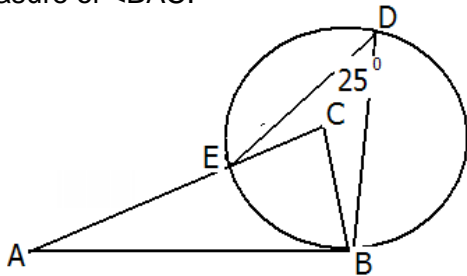
Q21. Find the ratio in which the line  $2x + y - 4 = 0$  divides the line segment joining the points A (2, -2) and B (3, 7). Also, find their point of intersection.

Q22. Prove that the diagonals of a rectangle bisect each other and are equal. **OR**

Find the point on the y-axis, which is equidistant from the points (12, 3) and (-5, 10).

Q23. The  $m^{\text{th}}$  term of an AP is n and the  $n^{\text{th}}$  term is m. Find the  $r^{\text{th}}$  term of the AP.

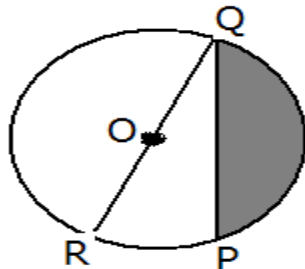
Q24. In the given figure, AB is a tangent to the circle with centre C at the point B. Find the measure of  $\angle BAC$ .



Q25. The length of the shadow of a tower standing on level plane is found to be  $2y$  metres longer when the sun's altitude is  $30^\circ$  than when it was  $45^\circ$ . Prove that the height of the tower is  $y(\sqrt{3}+1)$  metres. **OR,**

As observed from the top of a lighthouse, 100 metres high above sea level, the angle of depression of a ship moving directly towards it, changes from  $30^\circ$  to  $60^\circ$ . Determine the distance travelled by the ship during the period of observation.

Q26. Find the area of the shaded region if  $PQ=24\text{cm}$ ,  $PR=7\text{cm}$  and O is the centre of the circle.



Q27. A solid metallic sphere of radius 10.5 cm is melted and recast into a number of smaller cones, each of radius 3.5cm and height 3cm. Find the number of cones so formed.

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Q28. Water flows at the rate of 10m per minute through a cylindrical pipe having diameter 5mm. How much time will it take to fill a conical vessel whose base is of diameter 40cm and depth 24cm?

**SECTION D**

Q29. Two water taps together can fill a tank in  $75/8$  hrs. The bigger tap takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

**OR** One-fourth of a herd of camels was seen in the forest. Twice the square root of the herd had gone to mountains and the remaining 15 camels were seen on the bank of a river. Find the total number of camels.

Q30. Let A be one point of intersection of two intersecting circles with centres O and Q. The tangents at A to the two circles meet the circles again at B and C, respectively. Let the point P be located so the AOPQ is a parallelogram. Prove that P is the circumcenter of the triangle ABC.

Q31. Is it possible to locate a point X on the line segment PQ such that  $PQ: QX = \sqrt{7} / \sqrt{4} : \sqrt{4} / \sqrt{7}$ ? If yes, then construct it. Also, justify the construction.

Q32. Three numbers are in the ratio 3:7:9. If 5 is subtracted from the second, the resulting numbers are in AP. Find the original numbers.

**OR**

The interior angles of a polygon are in AP. The smallest angle is  $52^\circ$  and the common difference is  $8^\circ$ . Find the number of sides of the polygon.

Q33. A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 4cm and the diameter of its base is 8 cm. Determine the volume of the toy. If a cube circumscribes the toy, then find the difference of the volumes of cube and the toy. Also, find the total surface area of the toy.

Q34. The angle of elevation of a cloud from a point 60 metres above a lake is  $30^\circ$  and the angle of depression of the reflection of the cloud in the lake is  $60^\circ$ . Find the height of the cloud.