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SAMPLE PAPER 3

General Instructions:

1. All questions are compulsory.
2. The question paper consists of 31 questions divided into three sections A, B, C and D. Section – A comprises of 4 questions of one mark each, Section – B comprises of 6 questions of two marks each, Section – C comprises of 10 questions of three marks each and Section – D comprises of 11 questions of four marks each.
3. Use of calculator is not permitted.

SECTION – A

Question numbers 1 to 4 carry 1 mark each.

1. Find the roots of the equation $x^2 - 2x - (p^2 - 1) = 0$.
2. The coordinates of the centre of the given circle are (2, –3). If the coordinates of one end of a diameter of a circle are (0, 3), find the coordinates of the other end of the diameter.
3. The height of a tower is 100 m. When the altitude of the sun is 30^0, what is the length of its shadow?
4. What is the area of a quadrant of a circle of circumference 22 cm? $\left(Use\ \pi = \frac{22}{7}\right)$

SECTION – B

Question numbers 5 to 10 carry 2 marks each.

5. Solve for x: $2x^2 - 2\sqrt{2}x + 1 = 0$
6. Find the sum of first 40 odd natural numbers.
7. A circle touches all the four sides of a quadrilateral ABCD, the lengths of whose three sides are AB = 6 cm, BC = 7 cm, CD = 4 cm. Find the length of AD.
8. A fair die with six faces marked with numbers 1, 2, 3, 4, 5, 6 is thrown once. Find the probability of getting:

a. A composite number b. a number, factor of 6

9. Janya and Charvi are friends. What is the probability that they both will have their birthdays:

a. On the same day

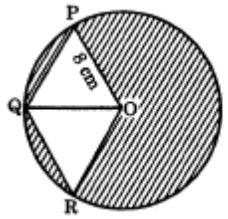
b. On different days (consider year to be non-leap year)

10. The minute hand of a clock is 7 cm long. Find the distance travelled by its tip in one minute. $\left(Use\ \pi = \frac{22}{7}\right)$

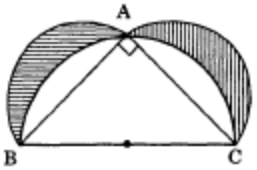
SECTION – C

Question numbers 11 to 20 carry 3 marks each.

11. Find the value of k for which the quadratic equation $x^2 - 2x(1 + 3k) + 7(3 + 2k) = 0$ has equal roots.
12. Find the 20^{th} term and n^{th} term of an A.P. whose 3^{rd} term is 7 and 7^{th} term exceeds three times the third term by 2.
13. Prove that the line segment joining the points of contact of two parallel tangents passes through the centre of the circle.
14. In the given figure, OPQR is a rhombus whose three vertices P, Q, R lie on a circle of radius 8 cm. Find the area of the shaded region.



15. A boy of height 1.7 m is standing 30 m away from a flagstaff on the same level ground. He observes that the angle of elevation of the top of the flagstaff is 30^0. Find the height of the flagstaff.
16. A copper rod of diameter 1 cm and length 8 cm is drawn into a wire of length 18 m of uniform thickness. Find the thickness of the wire correct to two decimal places.
17. Vertices of a triangle ABC are A (4 ,– 6), B (3, – 2) and C (5, 2). Find the area of triangles ABD and ACD where D is mid – point of BC. What is the relation between their areas? Can you recall any geometrical result in this connection?
18. Find the ratio in which the point P $\left(\frac{11}{6}, \frac{17}{6}\right)$ divides the line segment joining A (1, 2) and B (3, 4).
19. Two cubes each of volume 2197 cm^3 are joined end to end. Find the total surface area of the resulting cuboid.
20. In the given figure, ABC is a right angled triangle, right angled at A. Semicircles are drawn on AB, BC and AC as diameters. Prove that the area of the shaded region is equal to the area of the triangle ABC.



SECTION – D

Question numbers 21 to 31 carry 4 marks each.

21. The diagonal of a rectangular field is 60 m more than the shorter side. If the longer side is 30 m more than the shorter side, find the sides of the field.
22. 228 logs are to be stacked in a store in the following manner: 30 logs in the bottom, 28 in the next row, then 26 and so on. In how many rows can these 228 logs be stacked? How many logs are there in the last row?
23. Prove that the length of the tangents drawn from an external point to a circle are equal.
24. At the end points A and B, of a line segment AB of length 8 cm, two circles with centres A and B and of radii 4 cm and 3 cm are drawn. Draw the tangents from the centre of one circle to the other circle.
25. From the top of a hill the angles of depression of two consecutive kilometer stones due east are found to be 30^0 and 60^0. Find the height of the hill.
26. Two pipes can together fill a tank in $3\frac{1}{13}$ minutes. If one pipe takes 3 minutes more than the other to fill it, find the time in which each pipe can fill the tank.
27. Cards marked with numbers 5 to 50 are placed in a box and mixed thoroughly. A card is drawn from the box at random. Find the probability that the number on the card, taken out, is:

a. A prime number less than 23
b. A perfect square number
c. A multiple of 5 or 6.

28. A baby powder tin has a square base with side 5 cm and height 12 cm. Another tin has a circular base with radius 3.5 cm and height 10 cm. A shopkeeper sells the two powder boxes at the same price and suggests his customers to buy a powder box with square base. Is he true in his business? Which values are depicted by the shopkeeper? (Assuming that the same quality powder is in both the boxes)
29. The points A (2, 9), B (a, 5) and C (5, 5) are the vertices of a triangle ABC, right angled at B. Find the value of 'a' and hence find the area of triangle ABC.
30. Prove that the opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.
31. In the given figure, find the area of the shaded region, where ABCD is a square of side 7 cm and semicircles are drawn with each side of the square as diameter.