• कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 11 हैं।
• प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए कोड नंबर को छात्र उत्तर-पुस्तिका के मुखपृष्ठ पर लिखें।
• कृपया जाँच कर लें कि इस प्रश्न-पत्र में 31 प्रश्न हैं।
• कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, प्रश्न का क्रमांक अवश्य लिखें।
• इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा। 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे।
• Please check that this question paper contains 11 printed pages.
• Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
• Please check that this question paper contains 31 questions.
• Please write down the Serial Number of the question before attempting it.
• 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.
General Instructions:

(i) All questions are compulsory.

(ii) The question paper consists of 31 questions divided into four sections — A, B, C and D.

(iii) Section A contains 4 questions of 1 mark each. Section B contains 6 questions of 2 marks each, Section C contains 10 questions of 3 marks each and Section D contains 11 questions of 4 marks each.

(iv) Use of calculators is not permitted.

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SECTION A

प्रश्न संख्‍या 1 से 4 तक प्रत्येक प्रश्न 1 अंक का है।

Question numbers 1 to 4 carry 1 mark each.

1. 900 सेबों के एक ढेर में से यादृच्छिक एक सेब चुनने पर सड़ा हुआ सेब निकलने की प्राप्तिक या 0·18 है। ढेर में सड़े हुए सेबों की संख्या क्या है?

The probability of selecting a rotten apple randomly from a heap of 900 apples is 0·18. What is the number of rotten apples in the heap?
2. If a tower 30 m high, casts a shadow $10\sqrt{3}$ m long on the ground, then what is the angle of elevation of the sun?

3. If the angle between two tangents drawn from an external point $P$ to a circle of radius $a$ and centre $O$, is $60^\circ$, then find the length of $OP$.

4. What is the common difference of an A.P. in which $a_{21} - a_7 = 84$?

5. A circle touches all the four sides of a quadrilateral $ABCD$. Prove that $AB + CD = BC + DA$.

6. Prove that the tangents drawn at the end points of a chord of a circle make equal angles with the chord.
7. A line intersects the y-axis and x-axis at the points P and Q respectively. If (2, – 5) is the mid-point of PQ, then find the coordinates of P and Q.

8. If the distances of P(x, y) from A(5, 1) and B(− 1, 5) are equal, then prove that 3x = 2y.

9. Find the value of p, for which one root of the quadratic equation px² − 14x + 8 = 0 is 6 times the other.

10. For what value of n, are the n\(^{th}\) terms of two A.Ps 63, 65, 67,... and 3, 10, 17,... equal?

SECTION C

Question numbers 11 to 20 carry 3 marks each.

11. On a straight line passing through the foot of a tower, two points C and D are at distances of 4 m and 16 m from the foot respectively. If the angles of elevation from C and D of the top of the tower are complementary, then find the height of the tower.
12. A bag contains 15 white and some black balls. If the probability of drawing a black ball from the bag is thrice that of drawing a white ball, find the number of black balls in the bag.

13. Three semicircles each of diameter 3 cm, a circle of diameter 4.5 cm and a semicircle of radius 4.5 cm are drawn in the given figure. Find the area of the shaded region.

14. In what ratio does the point \( \left( \frac{24}{11}, y \right) \) divide the line segment joining the points P(2, -2) and Q(3, 7)? Also find the value of y.
15. Water in a canal, 5.4 m wide and 1.8 m deep, is flowing with a speed of 25 km/hour. How much area can it irrigate in 40 minutes, if 10 cm of standing water is required for irrigation?

16. In the given figure, two concentric circles with centre O have radii 21 cm and 42 cm. If ∠AOB = 60°, find the area of the shaded region.

[Use π = \(\frac{22}{7}\)]
17. The dimensions of a solid iron cuboid are 4·4 m × 2·6 m × 1·0 m. It is melted and recast into a hollow cylindrical pipe of 30 cm inner radius and thickness 5 cm. Find the length of the pipe.

18. A toy is in the form of a cone of radius 3·5 cm mounted on a hemisphere of same radius on its circular face. The total height of the toy is 15·5 cm. Find the total surface area of the toy.

19. How many terms of an A.P. 9, 17, 25, ... must be taken to give a sum of 636?

20. If the roots of the equation \((a^2 + b^2) x^2 - 2(ac + bd) x + (c^2 + d^2) = 0\) are equal, prove that \(\frac{a}{b} = \frac{c}{d}\).
22. Construct a triangle ABC with side \( BC = 7 \) cm, \( \angle B = 45^\circ \), \( \angle A = 105^\circ \). Then construct another triangle whose sides are \( \frac{3}{4} \) times the corresponding sides of the \( \triangle ABC \).

23. Two different dice are thrown together. Find the probability that the numbers obtained have
   (i) even sum, and
   (ii) even product.

24. In the diagram, \( XY \) and \( X'Y' \) are two parallel tangents to the circle \( O \). A tangent \( AB \) at point \( C \) intersects \( XY \) and \( X'Y' \) at \( A \) and \( B \) respectively. Prove that \( \angle AOB = 90^\circ \).
In the given figure, XY and X′Y′ are two parallel tangents to a circle with centre O and another tangent AB with point of contact C, is intersecting XY at A and X′Y′ at B. Prove that ∠AOB = 90°.

25. In a rain-water harvesting system, the rain-water from a roof of 22 m × 20 m drains into a cylindrical tank having diameter of base 2 m and height 3·5 m. If the tank is full, find the rainfall in cm. Write your views on water conservation.

26. Prove that the lengths of two tangents drawn from an external point to a circle are equal.
27. If the ratio of the sum of the first n terms of two A.Ps is \((7n + 1) : (4n + 27)\), then find the ratio of their 9th terms.

28. Solve for \(x\) :

\[
\frac{x - 1}{2x + 1} + \frac{2x + 1}{x - 1} = 2, \quad \text{where} \quad x \neq -\frac{1}{2}, 1
\]

29. A takes 6 days less than B to do a work. If both A and B working together can do it in 4 days, how many days will B take to finish it?

29. A takes 6 days less than B to do a work. If both A and B working together can do it in 4 days, how many days will B take to finish it?

30. From the top of a tower, 100 m high, a man observes two cars on the opposite sides of the tower and in same straight line with its base, with angles of depression 30° and 45°. Find the distance between the cars. [Take \(\sqrt{3} = 1.732\) ]
In the given figure, O is the centre of the circle with AC = 24 cm, AB = 7 cm and \( \angle BOD = 90^\circ \). Find the area of the shaded region.