• कृपया जाँच कर ले कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 11 हैं।
• प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए कोड नम्बर को छात्र उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें।
• कृपया जाँच कर ले 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 पूर्वाञ्चल 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.

संकलित परीक्षा – II
SUMMATIVE ASSESSMENT – II
गणित
MATHEMATICS

निर्धारित समय : 3 घण्टे
Time allowed : 3 hours

अधिकतम अंक : 90
Maximum Marks : 90

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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.

SECTION A

Question numbers 1 to 4 carry 1 mark each.

1. If one root of the quadratic equation $6x^2 - x - k = 0$ is $\frac{2}{3}$, then find the value of $k$. 

1. यदि द्विघात समीकरण $6x^2 - x - k = 0$ का एक मूल $\frac{2}{3}$ है, तो $k$ का मान ज्ञात कीजिए।
2. A ladder 15 m long makes an angle of 60° with the wall. Find the height of the point where the ladder touches the wall.

3. A solid metallic cuboid of dimensions 9 m × 8 m × 2 m is melted and recast into solid cubes of edge 2 m. Find the number of cubes so formed.

4. PQ is a tangent drawn from an external point P to a circle with centre O, QOR is the diameter of the circle. If ∠POR = 120°, what is the measure of ∠OPQ?

SECTION B

Question numbers 5 to 10 carry 2 marks each.

5. Solve for x:
   \[ \sqrt{3}x^2 + 10x - 8\sqrt{3} = 0 \]

6. If seven times the 7th term of an A.P. is equal to eleven times the 11th term, then what will be its 18th term?
7. Two different dice are thrown together. Find the probability that the product of the numbers appeared is less than 18.

8. If two adjacent vertices of a parallelogram are \((3, 2)\) and \((-1, 0)\) and the diagonals intersect at \((2, -5)\), then find the coordinates of the other two vertices.

9. In the given figure, if \(AB = AC\), prove that \(BE = EC\).

10. Find the probability that in a leap year there will be 53 Tuesdays.
Question numbers 11 to 20 carry 3 marks each.

11. If the roots of the quadratic equation \((a - b) x^2 + (b - c) x + (c - a) = 0\) are equal, prove that \(2a = b + c\).

12. Find the sum of the following series:
\[
5 + (-41) + 9 + (-39) + 13 + (-37) + 17 + ... + (-5) + 81 + (-3)
\]

13. The shadow of a tower at a time is three times as long as its shadow when the angle of elevation of the sun is 60°. Find the angle of elevation of the sun at the time of the longer shadow.

14. Find the coordinates of the points of trisection of the line segment joining the points \((3, -2)\) and \((-3, -4)\).
15. In the given figure, PA and PB are tangents to a circle from an external point P such that PA = 4 cm and \( \angle BAC = 135^\circ \). Find the length of chord AB.

16. Prove that the opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.
In the given figure, ABCD is a trapezium with AB \parallel DC, AB = 18 \text{ cm}, DC = 32 \text{ cm} and the distance between AB and AC is 14 \text{ cm}. If arcs of equal radii 7 \text{ cm} taking A, B, C and D as centres, have been drawn, then find the area of the shaded region.

18. एक ठोस लम्ब-क्षृतीय शंकु की त्रिज्या और ऊँचाई का अनुपात 5 : 12 है। यदि इसका आयतन 314 \text{ घन सेमी} हो, तो इसका सम्पूर्ण पृष्ठीय क्षेत्रफल ज्ञात कीजिए। \left[ \pi = 3.14 \right]
19. In the given figure, ΔABC is an equilateral triangle of side 3 units. Find the coordinates of the other two vertices.

20. Show that ΔABC with vertices A (–2, 0), B (0, 2) and C (2, 0) is similar to ΔDEF with vertices D (–4, 0), F (4, 0) and E (0, 4).
Prashan samay 21 se 31 tak pratyeck prashan 4 aanko ka hai.

Question numbers 21 to 31 carry 4 marks each.

21. Do chtya ant:sparsh karte hain | Unak khetraflon ka yogfal 116 \( \pi \) varg sami hai tatha unak kentron ke beech ki doori 6 sami hai | chtyon ki trijyaane, zaat kiijiye.

Two circles touch internally. The sum of their areas is \( 116 \pi \) cm\(^2\) and the distance between their centres is 6 cm. Find the radii of the circles.

22. Yadid \( 1 + 4 + 7 + 10 + ... + x = 287 \) hai, to x ka man zaat kiijiye.

If \( 1 + 4 + 7 + 10 + ... + x = 287 \), find the value of \( x \).

23. 3 semii va 5 semii trijyaane ke do sankentriy chtya kiichaye. Baadha chtya par ek bintu lekar ant: chtya par do sparsa-rekhane ke rachna kiijiye.

Draw two concentric circles of radii 3 cm and 5 cm. Taking a point on the outer circle, construct the pair of tangents to the inner circle.

24. 7 m. Oancha ek bhavan ke choti se ek meinara ke shikhar ke uttan kon 60\(^\circ\) tatha uske pad ke abhiman kon 45\(^\circ\) hai | Meinara ke oanchai zaat kiijiye. [\( \sqrt{3} = 1.732 \) prayog kiijiye.]

From the top of a 7 m high building, the angle of elevation of the top of a tower is 60\(^\circ\) and the angle of depression of its foot is 45\(^\circ\). Find the height of the tower. [Use \( \sqrt{3} = 1.732 \)]

25. Ek boxsme 90 discs (Discs) hain, jin par 1 se 90 tak samayden aanket hain (ek discs par ek samaya) | Yadi is boxsme se ek discs yautuchhaya nikali jata hai, to isk pratiikta zaat kiijiye ki is discs par aanket hogi (i) do ankon ke ek samaya, (ii) 5 se vibhaya ek samaya.

A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) a two-digit number, (ii) a number divisible by 5.
26. A well of diameter 3 m is dug 14 m deep. The soil taken out of it is spread evenly all around it to a width of 5 m to form an embankment. Find the height of the embankment.

27. Prove that the lengths of two tangents drawn from an external point to a circle are equal.

28. In a rectangular park of dimensions 50 m × 40 m, a rectangular pond is constructed so that the area of grass strip of uniform width surrounding the pond would be 1184 m². Find the length and breadth of the pond.

29. A park is of the shape of a circle of diameter 7 m. It is surrounded by a path of width 0.7 m. Find the expenditure of cementing the path, if its cost is ₹ 110 per sq. m.

30. A metallic right circular cone 20 cm high and whose vertical angle is 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of uniform diameter \( \frac{1}{16} \) cm, find the length of the wire.
A child puts one five-rupee coin of her saving in the piggy bank on the first day. She increases her saving by one five-rupee coin daily. If the piggy bank can hold 190 coins of five rupees in all, find the number of days she can continue to put the five-rupee coins into it and find the total money she saved.

Write your views on the habit of saving.