AGYAT GUPTA

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(M.Sc.B.Ed.M.Phill)
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Class - X

MATHEMATICS

Time : **3 to 3½** hours
समय : **3** से **3½** घण्टे

Maximum Marks : **80**
अधिकतम अंक : **80**

Total No. of Pages : **9**
कुल पृष्ठों की संख्या : **9**

General Instructions :

1. **All** questions are **compulsory**.
2. The question paper consists of **34** questions divided into **four** sections **A, B, C** and **D**. **Section - A** comprises of **10** questions of **1 mark** each, **Section - B** comprises of **8** questions of **2 marks** each, **Section - C** comprises of **10** questions of **3 marks** each and **Section - D** comprises of **6** questions of **4 marks** each.
3. Question numbers **1** to **10** in **Section - A** are multiple choice questions where you are to select **one correct** option out of the given four.
4. There is no overall choice. However, internal choice has been provided in **1** question of **two marks**, **3** questions of **three marks** each and **2** questions of **four marks** each. You have to attempt only one of the alternatives in all such questions.
5. Use of calculator is **not** permitted.
6. An additional **15** minutes time has been allotted to read this question paper only.

सामान्य निर्देश :

1. सभी प्रश्न **अनिवार्य** हैं।
2. इस प्रश्न-पत्र में **34** प्रश्न हैं, जो **चार** खण्डों **अ, ब, स** व **द** में विभाजित है। **खण्ड - अ** में **10** प्रश्न हैं और प्रत्येक प्रश्न **1** अंक का है, **खण्ड - ब** में **8** प्रश्न हैं और प्रत्येक प्रश्न **2** अंकों का है, **खण्ड - स** में **10** प्रश्न हैं और प्रत्येक प्रश्न **3** अंकों का है, **खण्ड - द** में **6** प्रश्न हैं और प्रत्येक प्रश्न **4** अंकों का है।
3. **खण्ड - अ** में प्रश्न संख्या **1** से **10** बहुविकल्पीय प्रश्न हैं। दिए गए चार विकल्पों में से **एक सही** विकल्प चुनें।
4. इसमें कोई भी सर्वोपरि विकल्प नहीं है, लेकिन आंतरिक विकल्प **1** प्रश्न **2** अंकों में, **3** प्रश्न **3** अंकों में और **2** प्रश्न **4** अंकों में दिए गए हैं। आप दिए गए विकल्पों में से एक विकल्प का चयन करें।
5. कैलकुलेटर का प्रयोग **वर्जित** है।
6. इस प्रश्न-पत्र को पढ़ने के लिए **15** मिनट का अतिरिक्त समय दिया गया है। इस अवधि के दौरान छात्र केवल प्रश्न-पत्र को पढ़ेंगे और वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे।

SECTION - A

Question numbers 1 to 10 carry 1 mark each. In question 1 to 10 four alternatives are given for each question, out of which only one is correct. Select the correct alternative.

1. Which of the following is a root of the equation $2x^2 - 5x - 3 = 0$?

(A) $x = 3$ (B) $x = 4$ (C) $x = 1$ (D) $x = -3$

2. If the angle between two radii of a circle is 100°, the angle between the tangents at the ends of those radii is :

(A) 50° (B) 60° (C) 80° (D) 90°

3. The area of a square inscribed in a circle of radius 8 cm is :

(A) 64 cm^2 (B) 100 cm^2 (C) 125 cm^2 (D) 128 cm^2

4. If the points (0, 0), (1, 2) and (x, y) are collinear, then

(A) $x = y$ (B) $2x = y$ (C) $x = 2y$ (D) $2x = -y$

5. If the area of a circle is 154 cm^2, then its perimeter is : $\left(\text{taking } \pi = \frac{22}{7}\right)$

(A) 22 cm (B) 44 cm (C) 50 cm (D) 56 cm

6. If an AP has $a = 1$, $t_n = 20$ and $S_n = 399$, then value of n is

(A) 20 (B) 32 (C) 38 (D) 40

7. The perimeter of a triangle with vertices (0, 4) (0, 0) and (3, 0) is :

(A) 8 (B) 10 (C) 12 (D) 15

8. If two tangents inclined at an angle of 60° are drawn to a circle of radius 3 cm, then length of tangent is equal to :

(A) $\sqrt{3}$ cm (B) $2\sqrt{3}$ cm (C) $\frac{2}{\sqrt{3}}$ cm (D) $3\sqrt{3}$ cm

9. If altitude of the sun is 60°, the height of a tower which casts a shadow of length 30 m is :

(A) $30\sqrt{3}$ m (B) 15 m (C) $\frac{30}{\sqrt{3}}$ m (D) $15\sqrt{2}$ m

10. Which of the following cannot be the probability of an event ?

(A) 0 (B) $\frac{1}{5}$ (C) $\frac{5}{4}$ (D) 1

SECTION - B

Question numbers 11 to 18 carry 2 marks each.

11. If $4a^2x^2 - 4abx + k = 0$ has equal roots of x, then find the value of k.

12. Two positive numbers differ by 3 and their product is 504. Find the numbers.

OR

Find the sum of all two digit positive numbers divisible by 3.

13. The length of a tangent from a point A at a distance 5 cm from the centre of the circle is 4 cm. Find the diameter of the circle.

14. Two tangents PQ and PR are drawn from an external point P to a circle with centre O. Prove PROQ is a cycle quadrilateral.

15. Determine the ratio in which the point $P(x, -2)$ divides the join of $A(-4, 3)$ and $B(2, -4)$. Also find the value of x.

16. Area of a sector of a circle of radius 36 cm is 54π cm^2. Find the length of corresponding arc of sector.

17. Two cubes each of edge 4 cm are joined face to face. Find the surface area of the resulting cuboid.

18. A dice is thrown once. Find the probability of getting :

(a) a prime number (b) a number divisible by 2

SECTION - C

Question numbers 19 to 28 carry 3 marks each.

19. In an A.P. the first term is -4, the last term is 29 and the sum of all its term is 150. Find its common difference.

20. For what values of k does $(k-12)x^2 + 2(k-12)x + 2 = 0$ has equal roots ?

21. The circumference of the base of a 9 m high wooden solid cone is 44 m. Find the volume of the cone.

22. A solid metallic sphere of diameter 21 cm is melted and recast into a number of smaller cones each of diameter 7cm and hight 3 cm. Find the number of cones so formed.

23. Find a point on x-axis which is equidistant from the points $A(-5, 4)$ and $B(-1, 6)$.

OR

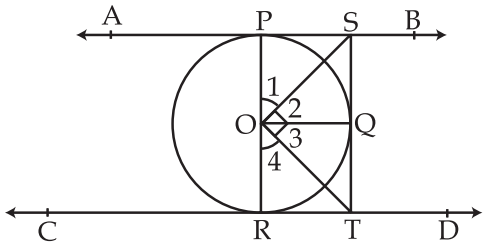
Show that the points $A(3, 4)$, $B(-4, 3)$ and $C(5, 0)$ lie on the circle having centre $O(0, 0)$

24. In what ratio does the x-axis divide the line segment joining the points $(-4, -6)$ and $(-1, 7)$. Also find the coordinates of the point of division.

25. If all the sides of a parallelogram touch a circle, show that the parallelogram is a rhombus.

OR

AB and CD are two parallel tangents to a circle with centre O. ST is a tangent segment between the parallel tangents touching the circle at Q. Show that $\angle SOT = 90°$.



26. An aeroplane flying horizontally 1 km above the ground is observed at an elevation of 60°. After 10 seconds, its elevation is observed to be 30°. Find the speed of the aeroplane in km/hr.

OR

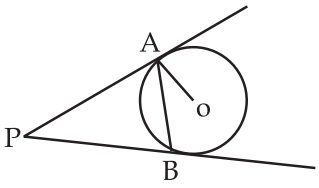
A tower is 60 m high. From the top of it the angles of depression of the top and the bottom of a tree are found to be 30° and 60° respectively. Find the height of the tree and its distance from the tower.

27. Two dice are thrown simultaneously. Find the probability of getting :

(a) same number on both dice .

(b) different numbers on both the dice.

28. Two tangents PA and PB are drawn to a circle with centre O from an external point P. Prove that $\angle APB = 2\angle OAB$.



SECTION - D

Question numbers 29 to 34 carries 4 marks each.

29. In an A.P. the sum of first ten terms is -80 and the sum of next ten terms is -280. Find the A.P.

OR

The sum of first 7 terms of an A.P. is 49 and that of first 17 terms is 289. Find the sum of first n terms.

30. Some students planned a picnic. The budget for food was Rs. 480. But 8 of them failed to go, the cost of food for each member increased by Rs. 10. How many students attended the picnic ?

OR

A fast train takes 3 hours less than a slow train for a journey of 600 km. If the speed of the slow train was 10 km/hr less than that of the fast train, find the speeds of the trains.

31. A well of diameter 3 m is dug 14 m deep. The earth taken out of it has been spread evenly all around it to a width of 4 m to form an embankment. Find the height of the embankment $\left(\text{use } \pi = \frac{22}{7}\right)$

32. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°.

33. If the radii of the ends of a bucket 45 cm high are 28 cm and 7 cm. Find its capacity and surface area.

34. The angle of elevation of the top of a building from the foot of a tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 50 m high. Find the height of the building.

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