Class - X

MATHEMATICS

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

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

Total No. of Pages : **11**
कुल पृष्ठों की संख्या : **11**

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।

1

Question numbers 1 to 10 carry 1 mark each. For each of the questions 1 to 10 four alternative choices have been provided of which only one is correct. You have to select the correct choice.

1. The roots of the equation $3x^2 - 4x + 3 = 0$ are :

    (A)   real and unequal   (B)   real and equal

    (C)   imaginary   (D)   none of these

2. Which term of the AP 24, 21, 18, ... is the first negative term. ?

    (A)   8th   (B)   9th   (C)   10th   (D)   12th

3. To divide a line segment AB in the ratio 3 : 4 we draw a ray AX, so that angle BAX is an acute angle, and then mark the points on the ray AX at equal distances such that the minimum number of these points is

    (A)   3   (B)   4   (C)   7   (D)   12

4. In Fig.1, PQR is the tangent to a circle at Q whose centre is O. AB is a chord parallel to PR and angle BQR = 70° then angle AQB is equal to
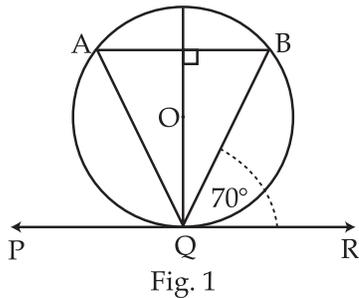
Fig. 1

    (A)   20°   (B)   40°   (C)   35°   (D)   45°

5. In Fig.2, the pair of tangents AP and AQ, drawn from an external point A to a circle with centre O, are perpendicular to each other and length of each tangent is 4 cm, then the radius of the circle is
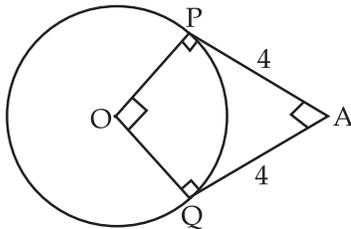
Fig. 2

    (A)   10 cm   (B)   7.5 cm   (C)   2.5 cm   (D)   4 cm

6. If the angle between two radii of a circle is 140°, then the angle between the tangents at the ends of the radii is :

(A) 90°   (B) 40°   (C) 70°   (D) 60°

7. The diameter of a metallic sphere is 6 cm. It is melted and drawn into a wire of diameter 2 cm, then the length of the wire is

(A) 12 cm   (B) 18 cm   (C) 36 cm   (D) 66 cm

8. The circumference of a circle is 44 cm. Then the area of circle is

(A) 276 cm^2 (B) 44 cm^2 (C) 176 cm^2 (D) 154 cm^2

9. A pole 10 m high cast a shadow 10 m long on the ground, then the sun's elevation is

(A) 60°   (B) 45°   (C) 30°   (D) 90°

10. In a throw of two dice, the probability of getting a sum of 10 is

(A) 1/12   (B) 1/36   (C) 1/6   (D) 1/4

SECTION - B

Question numbers 11 to 18 carries 2 Marks each.

11. Find the roots of the following quadratic equation

$6x^2 + 5x - 6 = 0$

12. Find the 10th term from the end of the AP 8, 10, 12, ..., 126

13. Out of the two concentric circles, the radius of the outer circle is 5 cm and the chord AC of length 8 cm is a tangent to the inner circle. Find the radius of the inner circle.

14. If the perimeter of a semi–circular protector is 66 cm, find the radius of the protector.

15. The surface area of a sphere is 616 cm^2. Find its radius.

16. If the point A(4, 3) and B(x, 5) are on the circle with centre O(2, 3). Find the value of x.

17. Three consecutive vertices of a parallelogram ABCD are A(1, 2) B(1, 0) and C(4, 0). Find the fourth vertex D.

AGYAT GUPTA   3

18. A bag contains 5 black, 7 red and 3 white balls. A ball is drawn from the bag at random. Find the probability that the ball drawn is

(i) Black or white   (ii) not black

<p style="text-align:center">**OR**</p>

Two dice are thrown at the same time. Find the probability of

(i) Same number on both the dice

(ii) Different number on both the dice

<p style="text-align:center">**SECTION - C**</p>

Question numbers 19 to 28 carry 3 Mark each.

19. Find the roots of the quadratic equation :

$2x^2 - 7x + 3 = 0$

<p style="text-align:center">**OR**</p>

The sum of the squares of two consecutive natural numbers is 421. Find the numbers.

20. Find the sum of all natural numbers between 200 and 1000 exactly divisible by 6.

21. In Fig.3, ABC is a right angled triangle, right angled at A, with AB = 6 cm and AC = 8 cm, a circle with centre O has been inscribed inside the triangle. Calculate the radius of the inscribed circle.

6 cm

Fig. 3

<p style="text-align:center">**OR**</p>

The length of the tangent from a point A at a distance of 15 cm from the centre of the circle is 12 cm. What is the radius of the circle ?

22. Construct a triangle ABC in which AB = 5 cm, BC = 6 cm and AC = 7 cm. Construct another triangle whose sides are 3/5 times the corresponding sides of triangle ABC.

23. In Fig.4, AB and PQ are perpendicular diameters of the circle whose centre is O and radius OA=7 cm. Find the area of shaded region. (Use $\pi = 22/7$)

Fig.4
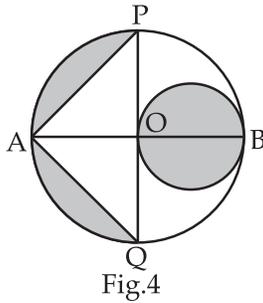
24. A semi–circular sheet of paper of diameter 28 cm is bent into an open conical cup. Find the depth and capacity of the cup.

OR

Find the area of the quadrant of that circle whose circumference is 22 cm (Use $\pi = 22/7$)

25. A tree breaks due to the storm and the broken part bends so that the top of the tree touches the ground making an angle of 45° with the ground. The distance from the foot of the tree to the point where the top touches the ground is 8 m. Find the height of the tree. (see Fig. 5)
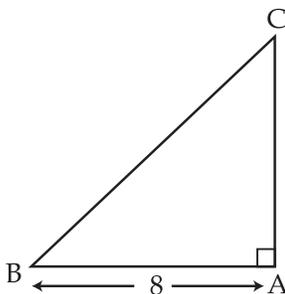
Fig. 5

26. Find a relation between x and y such that the point P(x, y) is equidistant from the points A(3, 6) and B(−3, 4)

27. Determine the ratio in which the line $2x + y - 4 = 0$ divides the line segment joining the points (2, −2) and (3, 7)

28. A box contains 12 balls out of which x are black. If one ball is drawn at random from the box, what is the probability that it will be a black ball ? If 6 more black balls are put in the box, the probability of drawing a black ball now is double of what it was before. Find x.

AGYAT GUPTA   5

SECTION - D

Question numbers 29 to 34 carries 4 marks each.

29. A two digit number is such that, the product of its digits is 18. When 63 is subtracted from the number, the digits interchange their places. Find the number.

OR

A takes 6 days less than the time taken by B to finish a piece of work. If both A and B together can finish it in 4 days, find the time taken by B to finish the work.

30. Find the sum of all natural numbers less than 100 and divisible by 6.

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

32. The rain water from a roof $22 \text{ m} \times 20 \text{ m}$ drain in to a conical vessel having diameter of base as 2 m and height 3.5 m. If the vessel is just full, find the rain fall in cm.

OR

A toy is in the form of a cone mounted on a hemisphere. The diameter of the base of the cone and that of hemisphere is 18 cm and the height of cone is 12 cm. Calculate the surface area of the toy. (Take $\pi = 3.14$).

33. A bucket is in form of a frustum of a cone of height is 30 cm with radii of its lower and upper ends as 10 cm and 20 cm respectively. Find the capacity of the bucket. Also find the cost of milk which can completely fill the container, at the rate of Rs. 25 per litre. (Take $\pi = 3.14$).

34. The angle of elevation of the top of a tower from two points P and Q at distance of 4 m and 9 m respectively from the base of the tower and in the same straight line with it are 60° and 30°. Prove that the height of the tower is 6 m.

- o 0 o -