Class - IX

MATHEMATICS

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

Maximum Marks : 80
अधिकतम अंक : 80

Total No. of Pages : 06
कुल पृष्ठों की संख्या : 06

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**, **4** 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 calculators 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 में **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 हैं, **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. 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, **4** 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. 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. Linear equation in one variable is :

   (A) $2x = y$ (B) $y^2 = 3y + 5$

   (C) $4x - y = 5$ (D) $3t + 5 = 9t - 7$

2. Graph of the equation $2x + 3y = 9$ cuts y - axis at the point :

   (A) $(\frac{9}{2}, 0)$ (B) (0, 9) (C) (0, 3) (D) (3, 1)

3. In a quadrilateral ABCD, diagonals bisect each other at right angles. Also AB = BC = AD = 6cm, then length of CD is :

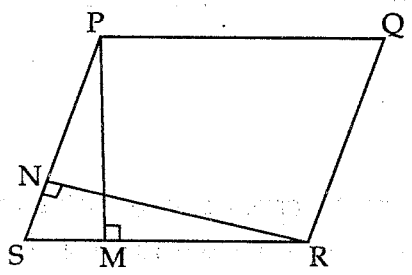
   (A) 3 cm (B) 6 cm (C) $6\sqrt{2}$ cm (D) 12 cm

4. In an equilateral triangle ABC,D and E are the mid points of sides AB and AC respectively. Then length of DE is :

   (A) Not possible to find (B) 3 cm

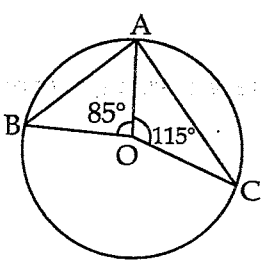
   (C) $\frac{1}{2}$ BC (D) $\frac{3}{2}$ BC

5. In figure, PQRS is a parallelogram, PM $\perp$ RS and RN $\perp$ PS. If PQ = 12cm PM = 6cm and RN = 8cm then the length of PS is equal to :



   (A) 18 cm (B) 9 cm (C) 4 cm (D) 12 cm

6. In the figure, O is the centre of the circle with $\angle AOB = 85°$ and $\angle AOC = 115°$ then $\angle BAC$ is :

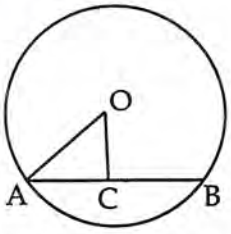


   (A) 115° (B) 85° (C) 80° (D) 100°

7. With the help of a ruler and a compass it is possible to construct an angle of :

(A) 35° (B) 40° (C) 37.5° (D) 47.5°

8. In the given figure, O is the centre of the circle, OA = 10 cm and OC = 6 cm. The length of AB is :



(A) 10 cm (B) 8 cm (C) 12 cm (D) 16 cm

9. The curved surface area of a hemisphere is 77 cm^2. Radius of the hemisphere is :

(A) 3.5 cm (B) 7 cm (C) 10.5 cm (D) 11 cm

10. The mean of the factors of 24 is :

(A) $\frac{10}{3}$ (B) $\frac{9}{4}$ (C) $\frac{15}{2}$ (D) $\frac{17}{3}$

SECTION - B

Question numbers 11 to 18 carry 2 marks each.

11. Find the value of k, if $x = 2$, $y = 1$ is a solution of $2x + 3y = k$.

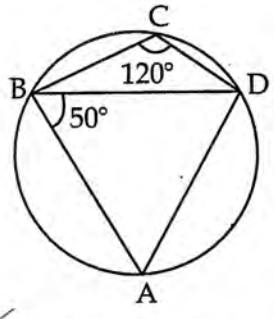
12. ABCD is a rhombus with $\angle ABC = 58°$. Find $\angle ACD$.

13. AD is a median of ΔABC. If X is any point on AD, show that $ar(\Delta ABX) = ar(\Delta ACX)$.

OR

Diagonals AC and BD of a trapezium ABCD with AB || CD intersect each other at O. Prove that $ar(\Delta AOD) = ar(\Delta BOC)$.

14. In the given figure, ABCD is cyclic quadrilateral, if $\angle BCD = 120°$ and $\angle ABD = 50°$, find $\angle ADB$.



15. Find the measure of each angle of a parallelogram, if one of its angles is 30° less than twice the smaller angle.

16. If slant height of a cone is 21 m and diameter of its base is 24 m, then find its total surface area.

17. Find the maximum number of cubes of sides 3 cm that can be cut out of a cuboid of dimensions 18cm × 12 cm × 9 cm.

18. Two dice are thrown simultaneously 200 times. Each time the sum of numbers appearing on their top is noted and recorded as below.

Sum	2	3	4	5	6	7	8	9	10	11	12
Frequency	18	10	26	16	25	29	15	4	24	20	13

Find the probability of getting a sum :

(i) more than 10 ?

(ii) less than or equal to 5 ?

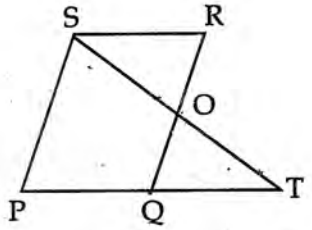
SECTION - C

Question numbers 19 to 28 carry 3 marks each.

19. Draw the graph of the equation $2(x+3)-3\,(1+y)=0$. Also find the point where the line meets x - axis.

20. The taxi fares in a city are as follows. For the first kilometre the fare is Rs. 12 and for the subsequent distance it is Rs. 7 per km. Taking the distance covered as x km and total fare as Rs. y, write a linear equation and draw the graph.

21. In the given figure, PQRS is a parallelogram in which PQ is produced to T such that QT = PQ. Prove that ST bisects RQ.

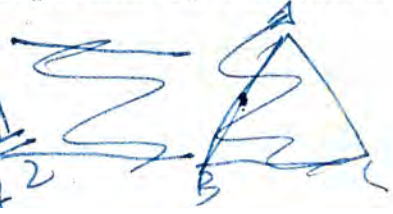


OR

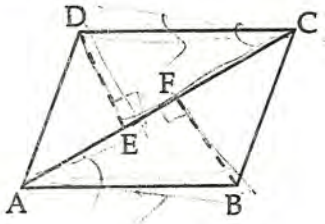
In a quadrilateral ABCD, AO and BO are the bisectors of $\angle A$ and $\angle B$ respectively. Prove that $\angle AOB = \frac{1}{2}(\angle C + \angle D)$.

22. XY is a line parallel to side BC of triangle ABC. If BE||AC and CF||AB meet XY at E and F respectively, show that ar(ABE) = ar(ACF).

OR



In the figure, DE and BF are perpendiculars to the diagonal AC of a parallelogram ABCD. Prove that DE = BF.



23. Construct a triangle XYZ in which $\angle Y = 30°$ $\angle Z = 90°$ and $XY + YZ + ZX = 11$ cm.

24. From a right circular cylinder with height 10 cm and radius of base 6 cm, a right circular cone of the same height and base is removed. Find the volume of the remaining solid. [use $\pi = \frac{22}{7}$]

25. A storage tank consists of a circular cylinder, with a hemisphere adjoined on either end. If the external diameter of the cylinder be 1.4 m and its length be 5 m, what will be the cost of painting it on the outside at the rate of Rs. 10 per square metre ? [use $\pi = \frac{22}{7}$]

OR

A solid sphere of radius 3 cm is melted and then cast into small spherical balls each of diameter 0.6 cm. Find the number of balls thus obtained.

26. Find the mean of the following data.

Marks	10	30	50	70	89
Frequency	7	8	10	15	10

27. The ages (in years) of workers of a factory are as follows :

Age (in years)	10-19	20-29	30-39	40-49	50-59	60 and above
No : of workers	5	40	26	15	8	6

If a worker is selected at random, find the probability that the worker is

(i) 30 years or more

(ii) below 50 years

(iii) having age from 10 - 19 years.

28. 1500 families with 2 children were selected randomly and the following data were recorded :

Number of girls in the family	2	1	0
Number of families	475	814	211

Compute the probability having

(i) Two girls (ii) One girl (iii) No girl.

$\pi r(r+l)$

SECTION - D

Question numbers 29 to 34 carry 4 marks each.

29. Solve for x, $\frac{4x+5}{6} - \frac{2(2x+7)}{3} = \frac{3}{2}$

30. Prove that the angle subtended by an arc at the centre is double of the angle subtended by it at any point on the remaining part of the circle.

OR

Prove that the circle drawn on any one of the equal sides of an isosceles triangle as diameter bisects the base of the triangle.

31. If the non - parallel sides of a trapezium are equal, prove that it is cyclic.

32. ABC is a triangle right angled at C.A line through the midpoint M of hypotenuse AB and parallel to BC intersects AC at D. Show that

(i) D is the mid - point of AC.

(ii) $MD \perp AC$

(iii) $CM = MA = \frac{1}{2}AB$.

33. A cone of radius 7 cm has a curved surface area 550 cm^2. Find its volume. [use $\pi = \frac{22}{7}$]

OR

The ratio of the total surface area to the curved surface area of the right circular cylinder is 3 : 2. Find the volume of the cylinder if its total surface area is 8316 cm^2.

34. Draw the frequency polygon without constructing the Histogram of the following observations.

Cost of living index	140 - 150	150 - 160	160 - 170	170 - 180	180 - 190	190 - 200	total
Number of weeks	5	10	20	9	6	2	52

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