



General Instructions:

Read the following instructions carefully and follow them :

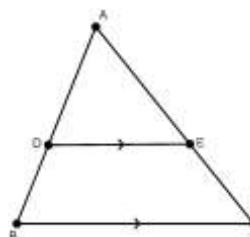
1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Question no. 1-18 are multiple choice questions (MCQs) and questions no.19 and 20 are Assertion - Reason based questions of 1 mark each.
4. In Section B, Questions no. 21 - 25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26 - 31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32 - 35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36 - 38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Question of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take $\pi = 22/7$ wherever required if not stated.
11. Use of calculators is not allowed.

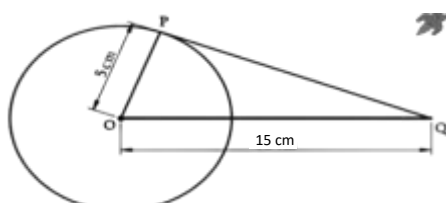
SECTION A

Section A consists of 20 questions of 1 mark each.

20

1. In $\triangle ABC$, D and E are points on side AB and AC respectively such that $DE \parallel BC$ and $AD : DB = 3 : 1$. If $EA = 3.3$ cm, then $AC =$ (1)
 A) 1.1 cm B) 5.5 cm C) 4 cm D) 4.4 cm
2. If zeros of the polynomial $f(x) = x^3 - 3px^2 + qx - r$ are in A.P., then (1)
 A) $2p^3 = pq + r$ B) $p^3 = pq - r$
 C) $2p^3 = pq - r$ D) None of these
3. In a cyclic quadrilateral ABCD, if $\angle A = (2x - 1)^\circ$, $\angle B = (y + 5)^\circ$, $\angle C = (2y + 15)^\circ$ and $\angle D = (4x - 7)^\circ$, then the value of $\angle C$ is (1)
 A) 55° B) 125° C) 65° D) 115°
4. The graphic representation of the equations $x + 2y = 3$ and $2x + 4y + 7 = 0$ gives a pair of (1)
 A) parallel lines B) coincident lines
 C) intersecting lines D) none of these
5. In the given figure, $DE \parallel BC$. $AB = 15$ cm, $BD = 6$ cm, $AC = 25$ cm, then AE is equal to (1)
 A) 18 cm B) 20 cm
 C) 15 cm D) 10 cm
6. Which of the following cannot be the probability of occurrence of an event ? (1)
 A) 0.2 B) 1.6 C) 0.8 D) 0.4



7. If $\sin\theta + \cos\theta = p$ and $\sec\theta + \operatorname{cosec}\theta = q$, then $q(p^2 - 1) =$ (1)
 A) $\frac{2}{4}$ B) 1 C) $\frac{q}{p^2}$ D) 2
8. Consider the frequency distribution of the heights of 60 students of a class: (1)
- | | | | | | | |
|----------------------|---------|---------|---------|---------|---------|---------|
| Height (in cm) | 150–155 | 155–160 | 160–165 | 165–170 | 170–175 | 175–180 |
| No. of Students | 16 | 12 | 9 | 7 | 10 | 6 |
| Cumulative Frequency | 16 | 28 | 37 | 44 | 54 | 60 |
- The sum of the lower limit of the modal class and the upper limit of the median class is :
 A) 320 B) 315 C) 330 D) 310
9. Out of the following statements (1)
- A. All similar polygons are congruent.
 B. Two triangles are similar if their corresponding sides are proportional.
 C. Two figures are congruent but not similar if they have the same shape and size.
 D. All similar triangles are congruent.
- A) (B) B) (A) C) (D) D) (C)
10. If two numbers do not have common factor (other than 1), then they are called (1)
 A) prime numbers B) co-prime numbers
 C) composite numbers D) twin primes
11. The sum of the first 7 terms of AP sequence, 27, 30, 33, is? (1)
 A) 152 B) 252 C) 100 D) 150
12. The distance of the point P(–6, 8) from the origin is (1)
 A) $\frac{2}{\sqrt{7}}$ B) 6 C) 8 D) 10
13. The marks obtained by 9 students in Mathematics are 59, 46, 30, 23, 27, 40, 52, 35 and 29.
 The median of the data is (1)
 A) 29 B) 35 C) 40 D) 150
14. In a right triangle ABC, $\angle B = 90^\circ$ and $2 AB = \sqrt{3} AC$, then $\angle C$ is (1)
 A) 90° B) 60° C) 75° D) 30°
15. The tops of two poles of height 16 m and 10 m are connected by a wire. If the wire makes an angle of 60° with the horizontal, then the length of the wire is (1)
 A) 12 m B) $10\sqrt{3}$ m C) 16 m D) 10 m
16. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q, such that OQ = 15 cm. (1)
- 
- A) 15 cm B) 13 cm
 C) 12 cm D) 3
17. If $\triangle ABC \sim \triangle PQR$ such that $AB = 9.1$ cm and $PQ = 6.5$ cm. If the perimeter of $\triangle PQR$ is 25cm, then the perimeter of $\triangle ABC$ is (1)
 A) 36 cm B) 30 cm C) 35 cm D) 34 cm

18. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre, then the length of the arc is (1)
- A) 22 cm B) 20 cm C) 21 cm D) 19 cm

DIRECTION: In the question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R).

Choose the correct option

- A) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
 B) Both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
 C) Assertion is correct but Reason is incorrect.
 D) Assertion is incorrect but Reason is correct.

19. **Assertion (A) :** $x^2 + 7x + 12$ has no real zeros
Reason (R) : A quadratic polynomial can have at the most two zeroes. (1)
20. **Assertion (A) :** Two identical solid cubes of side 5 cm are joined end to end. The total surface area of the resulting cuboid is 350 cm^2 .
Reason (R) : Total surface area of a cuboid is $2(lb + bh + hl)$ (1)

SECTION B

Section B consists of 5 questions of 2 marks each

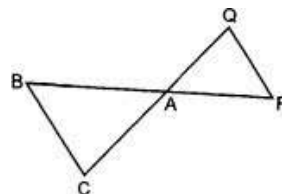
21. Had Ajita scored 10 more marks in her mathematics test out of 30 marks, 9 times these marks would have been the square of her actual marks. How many marks did she get in the test? (2)
22. Determine whether the given points are vertices of a right triangle: (8, 4), (5, 7) and (-1, 1). (2)
23. Find the HCF and LCM of 90 and 144 by the method of prime factorization. (2)
24. (A) If $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$, then prove that $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$. (2)

OR

- (B) If $\tan \theta + \sin \theta = m$ and $\tan \theta - \sin \theta = n$, show that $m^2 - n^2 = 4\sqrt{mn}$.
25. (A) If D and E are points on the respective sides $\triangle ABC$ such that, $AD = 6 \text{ cm}$, $BD = 9 \text{ cm}$, $AE = 8 \text{ cm}$, $EC = 12 \text{ cm}$. Prove that $DE \parallel BC$. (2)

OR

- (B) In the given figure, $\triangle ACB \sim \triangle AQP$.
 If $BC = 8 \text{ cm}$, $PQ = 4 \text{ cm}$, $BA = 6.5 \text{ cm}$.
 $AQ = 2.8 \text{ cm}$, find CA and PA .



SECTION C

Section C consists of 6 questions of 3 marks each

26. Find the value of c for which the quadratic equation $4x^2 + 2(c + 1)x + (c + 1) = 0$ has equal roots (3)
27. In a $\triangle ABC$, D and E are points on the sides AB and AC respectively. Show that $DE \parallel BC$:
 $AB = 10.8 \text{ cm}$, $BD = 4.5 \text{ cm}$, $AC = 4.8 \text{ cm}$, and $AE = 2.8 \text{ cm}$. (3)

28. (A) Find the ratio in which the point $(x, 2)$ divides the line segment joining the points $(-3, -4)$ and $(3, 5)$. Also find the value of x . (3)

OR

- (B) Determine the ratio in which the point $P(a, -2)$ divides the joining of $A(-4, 3)$ and $B(2, -4)$. Also, find the value of a .
29. There is a circular path around a sports field. Sonia takes 18 minutes to drive one round of the field, while Ravi takes 12 minutes for the same. Suppose they both start at the same point and at the same time, and go in the same direction. After how many minutes will they meet again at the starting point? (3)
30. (A) The angle of elevation of an aeroplane from a point A on the ground is 60° . After a flight of 15 seconds, the angle of elevation changed to 30° . If the aeroplane is flying at a constant height of $1500\sqrt{3}$ m, find the speed of the plane in km/hr. (3)

OR

- (B) The horizontal distance between two poles is 15 m. The angle of depression of the top of first pole as seen from the top of second pole is 30° . If the height of the first pole is 24 m, find the height of the second pole. [Use $\sqrt{3} = 1.732$]
31. Daily wages of 110 workers, obtained in a survey, are tabulated below: (3)

Daily wages (in Rs)	100 – 120	120 – 140	140 – 160	160 – 180	180 – 200	200 – 220	220 – 240
Number of workers	10	15	20	22	18	12	13

Compute the mean daily wages of these workers.

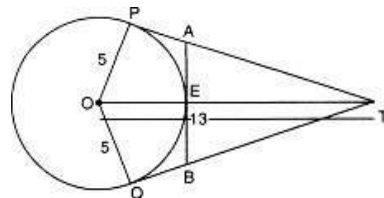
SECTION D

Section D consists of 4 questions of 5 marks each

32. (A) Show graphically that the system of equations (5)
- $$3x - y = 2$$
- $$9x - 3y = 6$$
- has infinitely many solutions.

OR

- (B) A two-digit number is such that the product of its digits is 20. If 9 is added to the number, the digits interchange their places. Find the number.
33. In Fig. O is the centre of a circle of radius 5 cm. T is a point such that $OT = 13$ cm and OT intersects circle at E. If AB is a tangent to the circle at E, find the length of AB, where TP and TQ are two tangents to the circle (5)

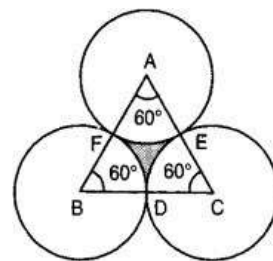


34. (A) A path of 4 m width runs round a semi-circular grassy plot whose circumference is $163\frac{3}{7}$ m (5)
- Find : (i) the area of the path
- (ii) the cost of gravelling the path at the rate of Rs 1.50 per square metre
- (iii) the cost of turfing the plot at the rate of 45 paise per m^2 .

OR

(B) The area of an equilateral triangle is $49\sqrt{3}$ cm².

Taking each angular point as centre, circle are drawn with radius equal to half the length of the side of the triangle. Find the area of the triangle not included in the circle. [Take $\sqrt{3} = 1.73$].



35. All the red face cards are removed from a pack of 52 playing cards. A card is drawn at random from the remaining cards, after reshuffling them. Find the probability that the drawn card is: (5)
- (i) of red colour
 - (ii) a queen
 - (iii) an ace
 - (iv) a face card.
 - (v) A jack or king.

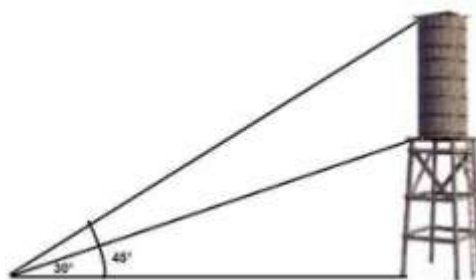
SECTION E

Section E consists of 3 case study based questions of 4 marks each.

36. Read the text carefully and answer the questions :

In a society, there are many multistory buildings. The RWA of the society wants to install a tower and a water tank so that all the households can get water without using water pumps. For this they have measured the height of the tallest building in the society and now they want to install a tower that will be taller than that so that the level of water must be higher than the tallest building in their society. Here is one solution they have found and now they want to check if it will work or not.

From a point on the ground 40 m away from the foot of a tower, the angle of elevation of the top of the tower is 30° . the angle of elevation of the top of the water tank is 45° .



- (i) What is the height of the tower?
- (ii) (A) What is the height of the water tank?

(1)
(2)

OR

- (B) What will be the angle of elevation of the top of the water tank from the place at $\frac{40}{\sqrt{3}}$ m from the bottom of the tower.

- (iii) At what distance from the bottom of the tower the angle of elevation of the top of the tower is 45° .

(1)

37. Read the text carefully and answer the questions:

Sehaj Batra gets pocket money from his father every day. Out of pocket money, he saves money for poor people in his locality. On 1st day he saves ₹27.5

On each succeeding day he increases his saving by ₹2.5.



(i) Find the amount saved by Sehaj on 10th day. (1)

(ii) (A) Find the total amount saved by Sehaj in 30 days. (2)

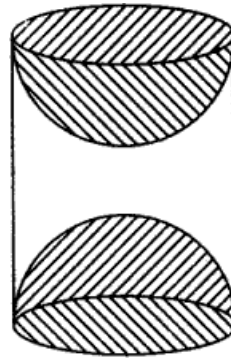
OR

(B) Find in how many days Sehaj saves ₹1400.

(iii) Find the amount saved by Sehaj on 25th day. (1)

38. Read the text carefully and answer the questions:

A carpenter used to make different kinds and different shapes of a toy of wooden material. One day a man came to his shop to purchase an article that has values as per his requirement. He instructed the carpenter to make the toy by taking a wooden block of rectangular shape with height 12 cm and width 9 cm, then shaping this block as a solid cylinder and then scooping out a hemisphere from each end, as shown in the given figure. The difference between the length of rectangle and height of the cylinder is 2 cm (Rectangle length > Cylinder height), and the difference between the breadth of rectangle and the base of cylinder is also 2 cm (Rectangle breadth > Cylinder base(diameter)).



(i) Find the volume of the cylindrical block before the carpenter started scooping the hemisphere from it. (1)

(ii) (A) Find the total surface area of the article? (2)

OR

(B) Find the total surface area of cylinder before scooping out hemisphere?

(iii) Find the volume of wood scooped out? (1)