Max.Marks:80

Time :3 HRS

General Instructions

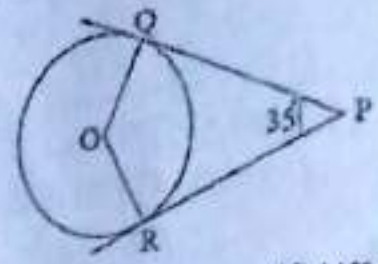
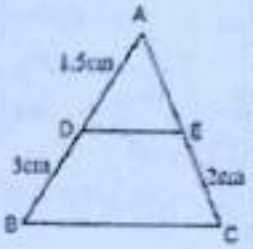
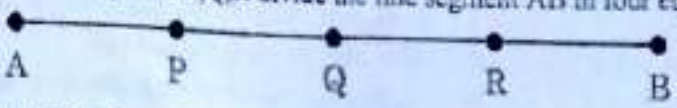
Read the following instructions carefully and follow them:

1. This question paper contains 38 questions. All Questions are compulsory.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Question numbers 1-18 are multiple choice questions (MCQs) and question no.19 and 20 are Assertion- Reason based questions of 1 mark each.
4. In Section B, Question numbers 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Question numbers 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Question numbers 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Question numbers 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. There is no overall choice. However, an internal choice in 2 questions 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. Take $\pi = 22/7$ wherever required if not stated.
10. Use of calculators is not allowed.

(Section A)

Section A consists of 20 questions of 1 mark each.

1	The 10th term from the end of the AP -5, -1, 3,7 .....23 is (a) -13 (b) 13 (c) 59 (d) −26	1
2	The discriminant of the quadratic equation $3x^2 + 2x - 1$ is (a) -8 (b) 16 (c) 14 (d) 4	1
3	For a distribution, if mean = 15 and mode = 12, then its median is : (a)12 (b) 13 (c) 14 (d) 15	1

4	In the given figure, PQ and PR are tangents to a circle centred at O. If $\angle QPR = 35^0$ then $\angle QOR$ is equal to  (a) 70° (b) 90° (c) 135° (d) 145°	1
5	3 bells ring at an interval of 4,7 and 14 minutes. All three bells rang at 6 am, When will the three bells ring together next? (a) 6:07AM (b) 6:14AM (c) 6:28AM (d) 6:25AM	1
6	In the given figure, if DE ∥ BC, AD = 1·5 cm, DB = 3 cm and EC = 2 cm, the length of AC is :  (a)1.5 (b) 3 (c) 3.5 (d) 4.5	1
7	In the figure given below , points P,Q,R divide the line segment AB in four equal parts.  The point Q divides PB in the ratio (a) 1:3 (b) 2:3 (c) 1:2 (d) 1:1	1
8	In triangles ABC and DEF if $\frac{AB}{DE} = \frac{BC}{FD}$, then they will be similar, when (a) $\angle B = \angle D$ (b) $\angle A = \angle D$ (c) $\angle B = \angle E$ (d) $\angle A = \angle F$	1
9	If the common difference of an AP is 3, then $a_{15} - a_9$ is (a) 66 (b) 18 (c) 6 (d) 22	1
10	From an external point Q, the length of the tangent to a circle is 12 cm and the distance of Q from the centre of the circle is 13 cm. The radius of circle (in cm) is (a) 10 (b) 5 (c) 12 (d) 7	1
11	Maximum number of common tangents that can be drawn to two circles intersecting at two distinct points is: (a) 4 (b) 3 (c) 2 (d) 1	1
12	The probability of getting a bad pen in a lot of 200 is 0.025. The number of bad pen in the lot is (a) 5 (b) 20 (c) 50 (d) 10	

13	$\frac{\sin A}{\sqrt{1-\sin^2 A}} =$ (a) cot A (b) $\sqrt{\cos A}$ (c) $\frac{\cos A}{\sqrt{\sin A}}$ (d) tanA	1
14	The distance of the point P (−3, −4) from the x-axis (in units) is (a) 3 (b) -3 (c) 4 (d) 5	1
15	One equation of a pair of dependent linear equations is -4x+5y=2. The second equation can be (a) -8x +10y +2=0 (b) 8x -10y =4 (c) 12x+15y=6 (d) -12x+15y-6=0	1
16	The class mark of a class interval is 55. If the class size is 10, then the lower limit of the class is (a) 60 (b) 45 (c) 50 (d) 65	1
17	If an arc of a circle of diameter 10 cm subtends an angle of 144° at the centre of the circle, then the length of the arc is : (a) 2π cm (b) 4π cm (c) 5π cm (d) 6π cm	1
18	A quadratic polynomial, the sum of whose zeroes is 0 and one zero is 4, is (a) $x^2 - 16$ (b) $x^2 + 16$ (c) $x^2 + 4$ (d) $x^2 - 4$	1
	DIRECTIONS: 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 (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A) (b)Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A) (c)Assertion (A) is true but reason (R) is false. (d)Assertion (A) is false but reason (R) is true.	
19	**ASSERTION (A):** Line joining the midpoints of two sides of the triangle is parallel to the third side. **REASON (R):** If a line divides two sides of a triangle in the same ratio then it is parallel to the third side.	1
20	**ASSERTION (A):** If a box contains 5 white, 2 red and 4 Black marbles, then the probability of not drawing a white marble from the box is $\frac{5}{11}$ **REASON (R):** P(not E)=1−P(E), where E is any event.	1
	(Section B) **Section B consists of 5 questions of 2 marks each.**	
21	Find the nature of the roots of the quadratic equation $2x^2 + x - 1 = 0$. If the real roots exist, find them.	2

22	(A) Show that the number $2 \times 5 \times 7 \times 11 + 11 \times 13$ is a composite number. **OR** (B) Find the smallest number which is divisible by both 306 and 657.	2
23	If one zero of a polynomial $p(x) = 6x^2 + 37x - (k - 2)$ is the reciprocal of the other, then find the value of k	2
24	(A) If $\sin\theta = \frac{3}{5}$, evaluate $\cos\theta + \tan\theta$ **OR** (B) Evaluate $\frac{\tan^2 60^0 + 4\sin^2 45^0 + 7\cos^2 90^0}{\text{cosec } 30}$	2
25	Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.	2

(Section C)

Section C consists of 6 questions of 3 marks each

26	The 10^{th} term of an AP is 52 and the 16^{th} term is 82. Find the 32nd term.	3
27	(A)The mode of the following frequency distribution is 38. Find the value of x.	3

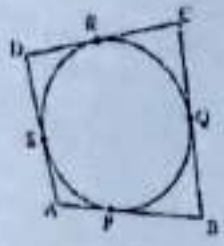
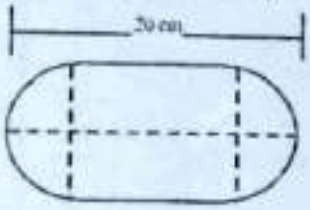
Class Interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	7	9	12	16	x	6	11

OR

(B)An inter house cricket match was organized by a school. Distribution of runs made by the students is given below. Find the median runs scored.

Runs scored	0-20	20-40	40-60	60-80	80-100
Number of students	4	6	5	3	4

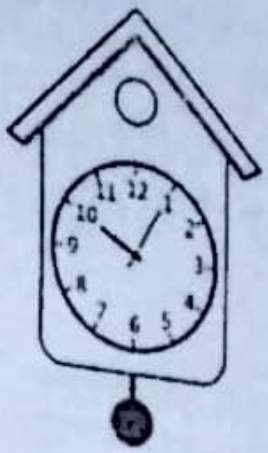
28	Show that $\sqrt{7} - 3$ is irrational.	3
29	Prove that: $(cosecA - sinA)(secA - cosA) = \frac{1}{tanA + cotA}$	3

30	A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC.  	3
31	(A) Solve the following pair of linear equations algebraically. $4x-y=4$ and $3x+2y=14$ **OR** (B) Find the value of k for which the pair of linear equations $kx + 3y - (k-3) = 0$ and $12x + ky = k$ has infinitely many solutions	3
	(Section D) **Section D consists of 4 questions of 5 marks each**	
32	State and prove Basic Proportionality Theorem	5
33	(A) Amit, standing on a horizontal plane, find a bird flying at a distance of 200 m from him at an elevation of 30^0. Deepak standing on the roof of a 50 m high building, finds the angle of elevation of the same bird to be 45^0. Amit and Deepak are on opposite sides of the bird. Find the distance of the bird from Deepak (Use $\sqrt{2}=1.41$) **OR** (B) As observed from the top of a 100 m high light house from the sea-level, the angles of depression of two ships are 30^0 and 45^0. If one ship is exactly behind the other on the same side of the light house, find the distance between the two ships [Use $\sqrt{3}=1.73$]	5
34	A solid is in the form of a cylinder with hemispherical ends. The total height of the solid is 20 cm and the diameter of the cylinder is 7 cm. Find the total volume of the solid. (Use $\pi=22/7$)  	5
35	(A) The area of a rectangular plot is 140 m^2. The length of the plot is one less than three times its breadth. What is the length and breadth of the plot? **OR** (B) A two digit number is such that the product of the digits is 14. When 45 is added to the number, then the digits are reversed. Find the number.	5

(Section E)

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

36 Kritika bought a pendulum clock for her living room. The clock contains a small pendulum of length 15 cm. The minute hand and hour hand of the clock are 9 cm and 6 cm long respectively.



Based on the given information, answer the following questions:

(i) Find the area swept by the minute hand in 10 minutes. 1

(ii) If the pendulum covers a distance of 22 cm in the complete oscillation, then find the angles described by the pendulum at the centre. 1

(iii)(A) Find the area swept by the hour hand in 1 hour. 2

OR

(iii)(B) Find the area swept by the hour hand between 11am and 5 pm 2

37 Sunil goes to the market to buy an aquarium for his house. He asked the shopkeeper to put some fish in the aquarium. The shopkeeper takes out 13 guppy fish, 18 flowerhorn fish, 12 koi fish and 11 angel fish from the big tank he had and put them in the aquarium that Sunil had bought. Now, he selects a fish at random.

(i)If the total number of male fish in the aquarium is 36, then what is the probability of selecting a female fish? 1

(ii)What is the probability of selecting a flowerhorn fish? 1

(iii)(A) What is the probability of not selecting a koi fish? 2

OR

(iii)(B)What is the probability of selecting neither an angel fish nor a flowerhorn fish? 2

38 In an examination hall, students are seated at a distance of 2 m from each other, to maintain the social distance due to the CORONA virus pandemic. Let three students sit at points A, Band C whose coordinates are (4, -3), (7,3) and (8, 5) respectively.

Based on the above information, answer the following questions.

(i) Find the distance between A and C

(ii) Find the mid-point of the line segment joining A and C 1

(iii)(A)If an invigilator is standing at point P on the straight line joining B and C, such that it divides the distance between them in the ratio 1:2, then find the coordinates of P. 1 2

OR

(iii)(B) Find the ratio in which B divides the line segment joining A and C 2