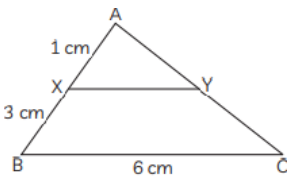
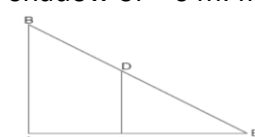


TIME: 3 hours
MAX.MARKS: 80
General Instructions:

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, Questions 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 mark 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 Questions of section B, 2 Questions of section C and 2 Questions of section D has been provided. And 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.		
1	Find the values of k for which the quadratic equation $kx(x-3)+9=0$ has real equal roots (A) $k=0$ or $k=4$ (B) $k=1$ or $k=4$ (C) $k=-3$ or $k=3$ (D) $k=-4$ or $k=4$	1
2	One card is drawn at random from a well-shuffled deck of 52 cards. What is the probability of getting a red Jack? (A) $\frac{1}{52}$ (B) $\frac{2}{52}$ (C) $\frac{1}{26}$ (D) $\frac{1}{13}$	1
3	If ABC and DEF are two triangles and $\frac{AB}{DE} = \frac{BC}{FD}$, then the two triangles are similar if (A) $\angle A = \angle F$ (B) $\angle B = \angle D$ (C) $\angle A = \angle D$ (D) $\angle B = \angle E$	1
4	The distance of the point P(4,-3) from the origin is (A) 1 unit (B) 7 units (C) 5 units (D) $\sqrt{7}$ units	1
5	A sector is cut from a circle of radius 21 cm. The angle of the sector is 150° . Find the length of the arc. (A) 56 cm (B) 57 cm (C) 55 cm (D) 58 cm	1
6	If $A = 2 \sec^2 x$ and $B = 2 \tan^2 x - 3$, then $A - B$ is equal to (A) 2 (B) 5 (C) 3 (D) -1	1
7	The length of a tangent from a point A at distance 10 cm from the center of the circle is 8cm. Find the radius of the circle. (A) 6 cm (B) 9cm (C) $\sqrt{164}$ cm (D) 5 cm	1
8	The points (-4, 0), (4, 0), (0, 3) are the vertices of a:	1

	(A) Right triangle (C) Equilateral triangle	(B) Isosceles triangle (D) Scalene triangle	
9	In figure 1, $XY \parallel BC$ and $AX : XB = 1 : 3$. The length of XY is: 		1
10	The value of k for which the system of linear equations $x + 2y = 3$, $5x + ky + 7 = 0$, has no solution is	(A) 3 (B) 5 (C) 5 (D) 10	1
11	A circle artist is climbing a 20 m long rope, which is tightly stretched and tied from the top of a vertical pole to the ground, then the height of pole, if the angle made by the rope with the ground level is 30° is	(A) 5 m (B) 20 m (C) 15 m (D) 10 m	1
12	When a die is thrown, the probability of getting a number at least 3 is	(A) $\frac{2}{3}$ (B) $\frac{1}{3}$ (C) $\frac{1}{2}$ (D) $\frac{2}{6}$	1
13	The sum of exponents of prime factors in the prime-factorization of 196 is	(A) 3 (B) 5 (C) 4 (D) 2	1
14	Two dice are thrown at the same time. Find the probability of getting different numbers on both dice.	(A) $\frac{25}{36}$ (B) $\frac{1}{36}$ (C) $\frac{1}{6}$ (D) $\frac{3}{6}$	1
15	If the points $A(4, 3)$ and $B(x, 5)$ are the two ends of diameter of the circle with center $O(2, 3)$ then the value of x is	(A) 0 (B) 1 (C) 2 (D) 3	1
16	Whether 4^n can end with the digit 0 for any natural number n .	(A) yes (B) never (C) can't say (D) always	1
17	Relationship between mean, mode and median is	(A) $3\text{median} = 2\text{mode} + \text{mean}$ (B) $3\text{median} - \text{mode} = 2\text{mean}$ (C) $\text{median} = 2\text{mode} + 3\text{mean}$ (D) $2\text{median} = 3\text{mode} + \text{mean}$	1
18	Two trees AB and CD are standing parallel to each other. The bigger tree 8 m high cast a shadow of 6 m. If height of smaller tree is 6m then shadow cast by it is 	(A) 2 m (B) 3.5m (C) 4m (D) 4.5 m	1
19	Assertion: If in a circle, the radius of the circle is 3 cm and distance of a point from the center of a circle is 5 cm, then length of the tangent will be 4 cm. Reason: $(\text{hypotenuse})^2 = (\text{base})^2 + (\text{height})^2$	(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 but 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	1

20	<p>Assertion : The zeroes of $x^2 - 5x + 2$ are both negative</p> <p>Reason : Any equation of the form $ax^2 + bx + c$ has real zeroes if D is less than and equal to zero.</p> <p>(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).</p> <p>(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).</p> <p>(c) Assertion (A) is true but reason (R) is false.</p> <p>(d) Assertion (A) is false but reason (R) is true.</p>	1
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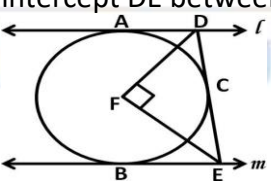
SECTION B

SECTION B CONSISTS OF 5 QUESTIONS OF 2 MARKS EACH

21	Prove that $2 + \sqrt{3}$ is an irrational number.	2
22(A)	Find the value of p , for which one root of the quadratic equation $px^2 - 14x + 8 = 0$ is 6 times the other.	2
OR		
22 (B)	If α and β are the zeros of the polynomial $f(x) = x^2 - 5x + k$ such that $\alpha - \beta = 1$, find the value of k .	2
23(A)	Find the length of a chord which is at a distance of 12 cm from the center of a circle of radius 13 cm.	2
OR		
23 (B)	A circle touches all the four sides of a quadrilateral ABCD from inside. Prove that $AB + CD = BC + DA$	2
24	The tenth term of an A.P. and the sum of its first six terms is -27. Find the sum of its first eight terms.	2
25	How many spherical lead shots of diameter 4 cm can be made out of a solid cube of lead whose edge measures 44 cm?	2

SECTION C

SECTION C CONSISTS OF 6 QUESTIONS OF 3 MARKS EACH

26	The angle of elevation of the top of a building from the foot of the 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.	3																		
27	<p>In figure. l and m are two parallel tangents at A and B. The tangent at C makes an intercept DE between the tangent l and m. Prove that $\angle DFE = 90^\circ$.</p> 	3																		
28(A)	<p>Calculate the median from the following frequency distribution.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;">Class</td> <td>5 - 10</td> <td>10 - 15</td> <td>15 - 20</td> <td>20 - 25</td> <td>25 - 30</td> <td>30 - 35</td> <td>35 - 40</td> <td>40 - 45</td> </tr> <tr> <td style="text-align: left;">Frequency</td> <td>5</td> <td>6</td> <td>15</td> <td>10</td> <td>5</td> <td>4</td> <td>2</td> <td>2</td> </tr> </table>	Class	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45	Frequency	5	6	15	10	5	4	2	2	3
Class	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45												
Frequency	5	6	15	10	5	4	2	2												
OR																				
28(B)	<p>The mode of the following frequency distribution is 36. Find the missing frequency f.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;">Class interval</td> <td>0- 10</td> <td>10-20</td> <td>20-30</td> <td>30-40</td> <td>40-50</td> <td>50-60</td> <td>60-70</td> </tr> <tr> <td style="text-align: left;">Frequency</td> <td>8</td> <td>10</td> <td>f</td> <td>16</td> <td>12</td> <td>6</td> <td>7</td> </tr> </table>	Class interval	0- 10	10-20	20-30	30-40	40-50	50-60	60-70	Frequency	8	10	f	16	12	6	7			
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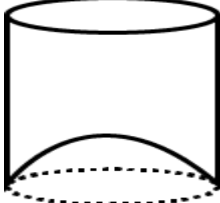
29	The ratio of incomes of two persons is 9 : 7 and the ratio of their expenditures is 4: 3. If each of them manages to save Rs 2000 per month, then find their monthly incomes.	3
30	If the mid point of the line joining (3,4) and (k,7) is (x,y) and lying on the line $2x + 2y + 1 = 0$, find the value of k.	3
31(A)	In triangle ABC, right-angled at B, $AB = BC$. Determine: (i) $\sin A + \cos C$ (ii) $\tan^2 A + \cot^2 A$	3
	OR	
31(B)	If $\sin(A - B) = \frac{1}{2}$, $\cos(A + B) = \frac{1}{2}$ $0^\circ < A + B \leq 90^\circ$, $A > B$, find $2\tan^2(A + B)$.	


SECTION D

SECTION D CONSISTS OF 4 QUESTIONS OF 5 MARKS EACH

32(A)	The diagonal of a rectangular field is 60 meters more than the shorter side. If, the longer side is 30 meters more than the shorter side, find the sides of the field.	5
	OR	
32(B)	In a flight for 3000 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 100 km/hr and consequently time of flight increased by one hour. Find the original duration of flight.	5
33(A)	Prove that: $\frac{\cos A}{1 + \sin A} + \frac{1 + \sin A}{\cos A} = 2 \sec A$	5
33(B)	OR	
	Prove that, $\frac{\sin^3 \theta + \cos^3 \theta}{\sin \theta + \cos \theta} = (1 - \sin \theta \cos \theta)$.	5
34(A)	In a circle of radius 21 cm, a minor arc subtends an angle of 120° at the center. Then find out area of minor sector and area of corresponding minor segment.	5
	OR	
34(B)	A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 5 m long rope. Find (i) the perimeter of that part of the field in which the horse can graze. (ii) the area of that part of the field in which the horse can graze. (iii) the increase in the grazing area if the rope were 10 m long instead of 5 m. (Use $\pi = 3.14$)	5
35	State and prove Basic Proportionality Theorem. Using the theorem prove that a line through the point of intersection of the diagonals and parallel to the trapezium divides the non-parallel sides in the same ratio.	5

SECTION E.

36	<p>Read the text carefully and answer the questions:</p> <p>A juice seller is serving his customers using cylindrical container with radius 20cm and height 50cm. He serves juice into a glass as shown in Fig. The inner diameter of the cylindrical glass is 5 cm, but the bottom of the glass had a hemispherical raised portion which reduced the capacity of the glass.</p> 	
(I)	If the height of a glass was 10 cm, find the apparent capacity of the glass.	1
(II)	If the container coated in and out with golden color, what is the surface area to be covered with golden coating. (Use $\pi = 3.14$)	1

(III)(A)	Find the capacity of the container in liter if juice in container is 5 cm below the actual height?	2
	OR	2
(III)(B)	How many glasses he serves if the container is full?	
37	<p>Read the text carefully and answer the questions:</p> <p>Suman is celebrating his birthday. He invited his friends. He bought a packet of toffees/candies which contains 360 candies. He arranges the candies such that in the first row there are 3 candies, in second there are 5 candies, in third there are 7 candies and so on.</p> 	
(I)	Find the total number of rows of candies.	1
(II)	How many candies are placed in 5th row from last?	1
(III)(A)	Find the number of candies in middle row/rows.	2
	OR	
(III)(B)	If Aditya decides to make 15 rows, then how many total candies will be placed by him with the same arrangement?	2
38	<p>Read the text carefully and answer the questions:</p> <p>There are 15 balls numbered from 1 to 15 are used in a game. Players come and pick the ball randomly to play the game. Then</p> 	
(I)	What is the probability of drawing a ball having prime number?	1
(II)	What is the probability of drawing a perfect square number?	1
(III)(A)	What is the probability of drawing a multiple of three or an even number on it?	2
	OR	
(III)(B)	What is the probability of drawing a ball numbered at most 5?	2

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