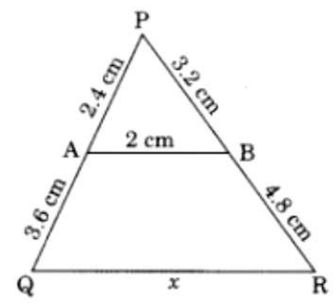
CLASS-X MAX.MARKS:80

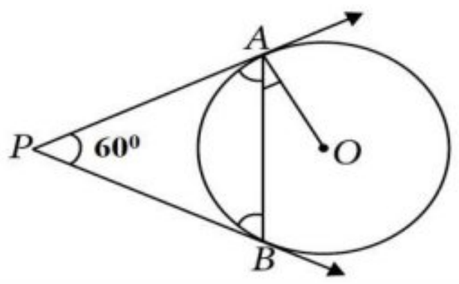
MATHEMATICS MAX. TIME:3 hrs

General Instructions:

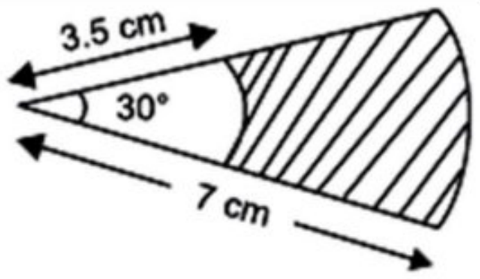
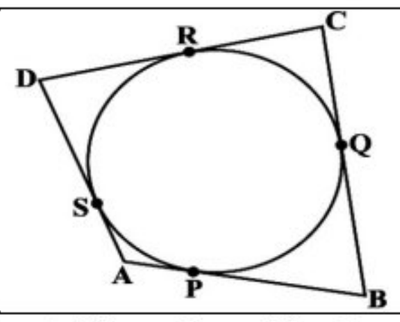
1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with subparts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E
8. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever not stated.

Section -A

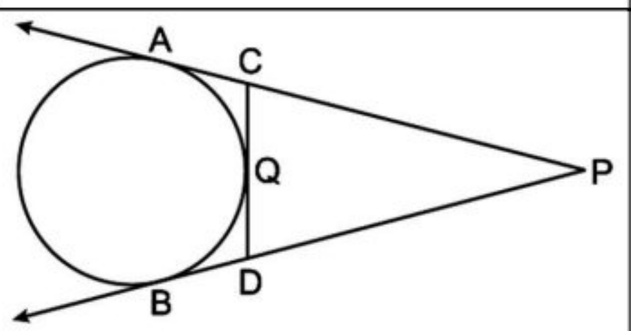
Q.No.	Question	Marks
1	Express 98 as a product of its primes a) 2×7^2 b) $2^2 \times 7^2$ c) $2^2 \times 7$ d) $2^3 \times 7$	1
2	The zeroes of the polynomial $4x^2 - 12x + 9$ are (a) $\frac{3}{2}, \frac{3}{2}$ (b) $-\frac{3}{2}, -\frac{3}{2}$ (c) 3,4 (d))$-3, -4$	1
3	For a frequency distribution, mean , median and mode are connected by the relation (a) mode= 3 mean – 2 median (b) mode = 2 median – 3 mean (c) mode = 3 median – 2 mean (d) mode= 3 median + 2 mean	1
4	If a kite is flying at a height of $40\sqrt{3}$ m from the level ground, attached to a string inclined at 60^0 to the horizontal then the length of string is (a)$80\sqrt{3}$ (b)$60\sqrt{3}$ (c)80 (d)12	1
5	The circumference of the edge of a hemispherical bowl is 132 cm. When π is taken as 22/7, the radius of the hemisphere is (a) 21 (b) 42 (c) 2772 (d) none of these	1
6	The distance of the point P(a Cosθ , a Sinθ) from the origin is (a) $Cos\theta$ (b) 1 (c) 2 (d) a	1
7	If the first three terms of an AP are $3p - 1, 3p + 5$ and $5p + 1$ respectively, then the value of p is (a) 2 (b) 5 (c) 4 (d) -3	1
8	ABCD is a rectangle whose three vertices are B (4, 0), C(4, 3) and D(0, 3). The length of one of its diagonals is (a) 5 (b) 4 (c) 3 (d) 25	1
9	In the given figure, if AB ‖QR, the value of x = (a) 3 cm (b) 4 cm (c) 5 cm (d) 6 cm 	1

<table>
<tr><td>10</td><td>In the given figure, PA and PB are tangents to the circle with centre O. If ∠APB = 60°, then ∠OAB is
(a) 30° (b) 60°
(c) 90° (d) 15°
  </td><td>1</td></tr>
<tr><td>11</td><td>For the following distribution, the modal class is
<table><tr><td>Marks</td><td>Below 10</td><td>Below 20</td><td>Below 30</td><td>Below 40</td><td>Below 50</td><td>Below 60</td></tr><tr><td>No. of Students</td><td>3</td><td>12</td><td>27</td><td>57</td><td>75</td><td>80</td></tr></table>(a) 10 – 20 (b) 20 – 30 (c) 30 – 40 (d) 50 – 60</td><td>1</td></tr>
<tr><td>12</td><td>HCF of 8, 9, 25 is
(a) 8 (b) 9 (c) 25 (d) 1</td><td>1</td></tr>
<tr><td>13</td><td>If in triangle ABC and DEF, AB/DE = BC/EF , then they will be similar when
(a) ∠B = ∠E (b) ∠A = ∠D (c) ∠B = ∠D (d) ∠A = ∠F</td><td>1</td></tr>
<tr><td>14</td><td>A card is selected from a deck of 52 cards. The probability of being a red face card is
(a) 3/26 (b) 6/26 (c) 6/13 (d) 3/13</td><td>1</td></tr>
<tr><td>15</td><td>11. The point which divides the line segment of points P(-1, 7) and (4, -3) in the ratio of 2:3 is:
(a) (-1, 3) (b) (-1, -3) (c) (1, -3) (d) (1, 3)</td><td>1</td></tr>
<tr><td>16</td><td>If $\sqrt{3}$ sin θ – cos θ = 0 and 0° < θ < 90°, find the value of θ.
(a) 30° (b) 45° (c) 60° (d) 90°</td><td>1</td></tr>
<tr><td>17</td><td>If HCF (16, y) = 8 and LCM (16, y) = 48, then the value of y is
(a) 24 (b) 16 (c) 8 (d) 48</td><td>1</td></tr>
<tr><td>18</td><td>If one root of the quadratic equation $2x^2 + kx – 6 = 0$ is 2, then,the value of k -1 is
(a) 1 (b) – 1 (c) 2 (d) – 2</td><td>1</td></tr>
<tr><td colspan="3">In question numbers 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</td></tr>
<tr><td>19</td><td>Assertion(A): Two cubes each of volume 125 cm^3 are joined end to end to form a Cuboid The surface area of the resulting cuboid is 250 cm^2
Reason(R):If n cubes each of volume a^3 cu. Units are joined end to end to form a Cuboid. Then the surface area of the resulting cuboid is $2(2n+1)a^2$ square units</td><td>1</td></tr>
<tr><td>20</td><td>Assertion:- If the radius of sector of a circle is reduced to its half and angle is doubled then the perimeter of the sector remains the same
Reason :- The length of the arc subtending angle θ at the centre of a circle of radius r = $\frac{\Pi r\theta}{180}$.</td><td>1</td></tr>
</table>

Section -B

21	A vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time, a tower casts a shadow 28 m long. Find the height of the tower.	2
22	In the given figure, sectors of two concentric circles of radii 7 cm and 3.5 cm are given. Find the area of the shaded region. (Use $\pi = \frac{22}{7}$)  **OR** A horse is placed for grazing inside a rectangular field 70 m by 52 m and is tethered to one corner by a rope 21 m long. On how much area can it graze?	2
23	If $\tan(A+B) = \sqrt{3}$ and $\tan(A-B) = \frac{1}{\sqrt{3}}$, $0 \le A+B \le 90°$ and $A > B$, then find A and B	2
24	A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC. 	2
25	Find the zeroes of the quadratic polynomial $x^2 - 7x + 12$ and verify the relationship between the zeroes and the coefficients of the polynomial.	2

Section –C

26	Prove that $\sqrt{7}$ is irrational	3
27	In figure PA and PB are tangents to the circle drawn from an external point P. CD is the third tangent touching the circle at Q. If PA = 15 cm, find the perimeter of ΔPCD.  **OR** Two concentric circles are of radii 8 cm and 5 cm. Find the length of the chord of the larger circle which touches the smaller circle.	3
28	If the 3rd and the 9th terms of an AP are 4 and – 8 respectively, which term of this AP is zero?	3
29	Prove that $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \sec\theta + \tan\theta$ (or) Evaluate : $\frac{5\tan 60°}{(\sin^2 60° + \cos^2 60°)\tan 30°}$	3
30	Two dice are thrown at the simultaneously. Find the probability of getting (i) a doublet (ii) sum on two dice is less than 9 (iii) sum two dice is an even number.	3
31	Solve the following linear equations to find the value of x and y $47x + 31y = 63$; $31x + 47y = 15$	3

Section –D

32 The median of the following data is 50. Find the values of p and q, if the sum of all frequencies is 90. Also find the mode. **5**

Marks obtained	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Number of students	p	15	25	20	q	8	10

33 Show that a line drawn parallel to one side of a triangle intersecting the other two sides in the distinct points then the other sides are divided in the same ratio. **5**

34 A rocket is in the form a right Circular Cylinder closed at the lower end and surmounted by a cone with same radius as that of cylinder. The diameter and height of the cylinder are 9 m and 15 m, respectively. If the slant height of the conical portion is the 7.5 m, find the total surface area and volume of the rocket. **5**

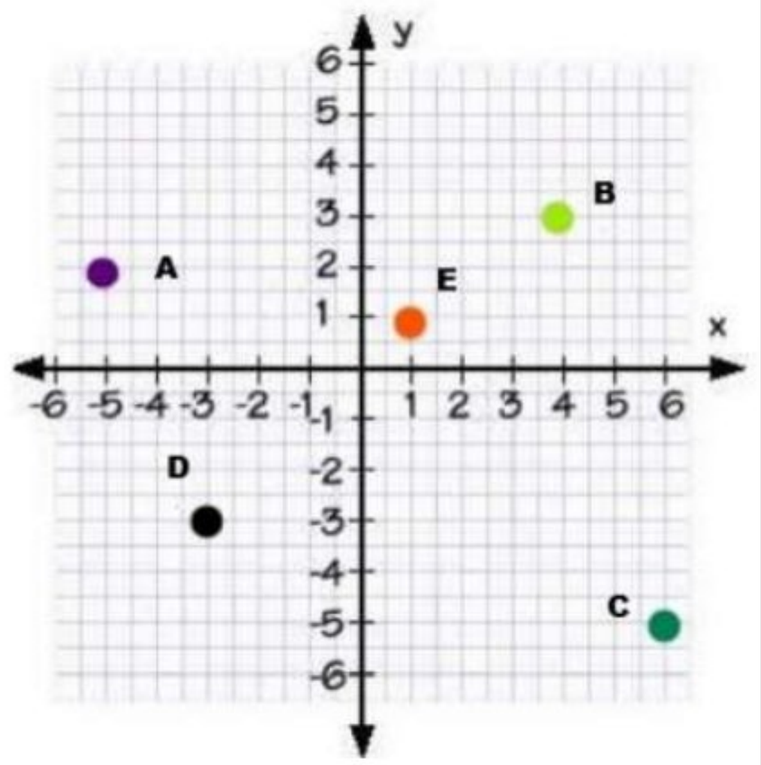
(OR)

A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of hemisphere is 12cm and the total height of vessel is 10 cm. Find the inner surface area and volume of the vessel.

35 A passenger train takes 2 hours less for a journey of 300 km if its speed is increased by 5 km/hr from its usual speed. Find the usual speed of the train? **5**

Section –E

36 Students of class X, Emma, Anna, Krish and Sahil gathered in the Library. On the Library notice board the positions of Some books are marked. Point A – Science Guide, Point B – Maths guide, Point C – Sanskrit guide, Point D – English guide and point E – History guide. Based on the information answer the following questions. **4**

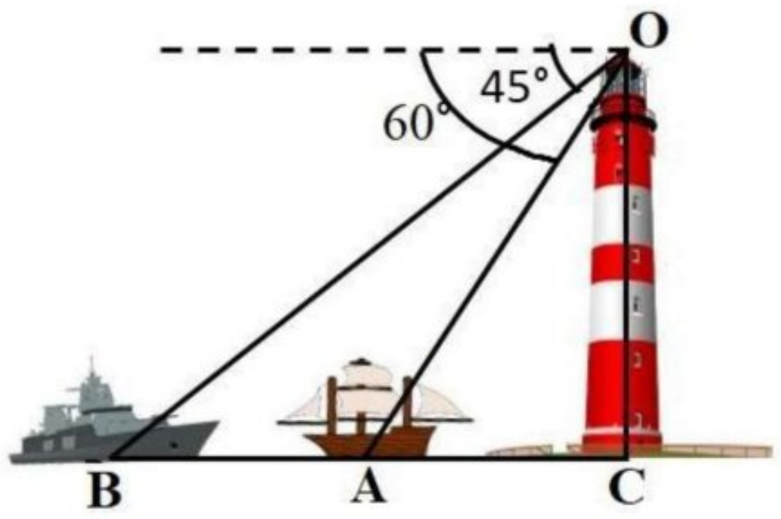


(i) How much distance does Emma has to walk to get the Science guide, if her starting point is (0,2) ? [1]

(ii) How far apart are the English and Sanskrit guide ? [1]

(iii) Find the distance between the location of Maths guide and Sahil's starting point (which is at origin). [2]

(iv)Are the points D and E equidistant from A? [2]

37	Aditya is celebrating his birthday. He invited his friends. He bought a packet of toffees/candies which contains 120 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. On the basis of the above information, answer any four of the following questions: 1. Find the common difference of the AP. 2. Find the number of candies placed in 7th row? 3. Find the total number of rows of candies OR Find the difference in number of candies placed in 9th and 4th rows.	4
38	A person/observer on the sea coast observes two ships in the sea, both the ships are in same straight path one behind the other. If the observer is on his building of height 20 meters (including observer) and he observes the angle of depression of two ships as 45° and 60° respectively.  Based on above information answer the following questions. (i) If a person observes a ship whose angle of depression is 60° then how much distance is the ship away from him? (ii)If a person observes another ship whose angle of depression is 45° then how much distance that ship is away from him? (iii)If a person observes the ship whose angle of depression changes from 60° to 30° then how far be ship from the observer if the observer is at 20 m of height (including him)? **(OR)** At a time when a person observes two ships whose angle of depressions are 60° and 45° the distance between the ships is (in meters).	4