



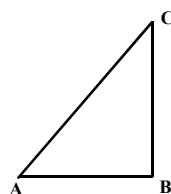
Instructions :

- Read each question carefully before writing the answer.
- Give explanations wherever necessary.
- First 15 minutes is cool-off time.
- No need to simplify irrationals like $\sqrt{2}$, $\sqrt{3}$, π , etc. using approximations unless you are asked to do so.

Answer any three questions from 1 to 4. Each question carries 2 marks. (3x2 = 6)

- 1) Common difference of an arithmetic sequence is 4 and its 12th term is 66.
(a) Find its 11th term.
(b) Find its first term.
- 2) A box contains paper slips numbered all even number between 1 and 15.
(a) How many paper slips are there in the box?
(b) A paper slip is taken from the box without looking it.
Find the chance that the number is a multiple of 3.

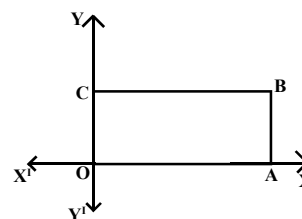
- 3) In the figure $\angle A = 60^\circ$, $\angle B = 90^\circ$.
(a) What is the measure $\angle C$?
(b) If $AC = 12$ centimetres, then find AB .



- 4) Score of 8 students in an exam are given below.
25, 32, 43, 30, 36, 45, 43, 38
Find the Median Score.

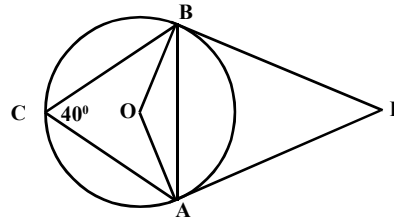
Answer any five questions from 5 to 11. Each question carries 3 marks. (5x3 = 15)

- 5) In the figure OABC is a rectangle.
(a) O (0, 0), A (6, 0) then find the length of OA.
(b) If $AB = 3$ units, then find co-ordinates of B and C.



- 6) $P(x) = x^2 - 5x + 10$
(a) Find $P(2)$.
(b) What number is to be subtracted from $x^2 - 5x + 10$ gives a polynomial for which $x - 2$ is a factor?
(c) Write $x^2 - 5x + 6$ as the product of two first degree polynomials.
- 7) Draw a circle of radius 3.5 centimetres. Hence draw a triangle with two of its angles are 40° , 55° and all the vertices are on the circle.
- 8) A cone is made by rolling a sector. Slant height of the cone is 20 centimetres and its height is 16 centimetres.
(a) Find the radius of the sector?
(b) Find the radius of the cone?
(c) Find central angle of the sector?

9) In the figure A, B, C are points on the circle centered at 'O'. PA and PB are tangents. $\angle C = 40^\circ$

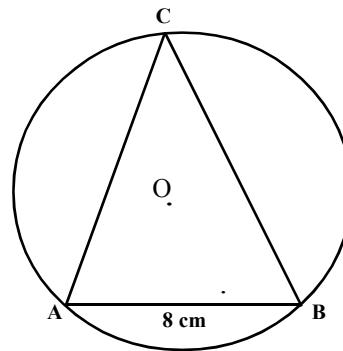


- (a) Find $\angle AOB$.
 (b) Find all angles of triangle APB.

- 10) (a) If 'x' is a number such that it is a multiple of 4, then write the next multiple of 4.
 (b) Product of two consecutive multiples of 4 is 320. Using this idea form a second degree equation.
 (c) Product of two consecutive multiples of 4 is 320. Find those numbers.

11) In the figure, O is centre of circumcircle of triangle ABC. $\angle A = 50^\circ$, $\angle B = 80^\circ$ and AB = 8 centimetres.

($\sin 50^\circ = 0.77$, $\cos 50^\circ = 0.64$, $\tan 50^\circ = 1.19$
 $\sin 80^\circ = 0.98$, $\cos 80^\circ = 0.17$, $\tan 80^\circ = 5.67$)



- (a) What is the measure of $\angle C$?
 (b) Find diameter of circle.
 (c) Find the perimeter of triangle ABC.

Answer any seven questions from 12 to 21. Each questions carries 4 marks. [7x4 = 28]

12) Draw a rectangle with sides 6 centimetres and 4 centimetres. Then draw another rectangle of length 7 centimeters and having area, equal to that of the first rectangle.

13) Some households in a locality are sorted according to their electricity usage, is given below.

Use of Electricity (Units)	No. of Households
0 - 60	4
60 - 120	10
120 - 180	12
180 - 240	15
240 - 300	14
300 - 360	4

- (a) Find the total number of households.
 (b) If the household using the least unit of electricity is numbered as one and the second least as two and so on. Then what is the assumed 'usage of electricity' of the 27th household.
 (c) Calculate the median usage of electricity.

- 14) There are two boxes, each contain paper slips numbered from 1 to 9. A slip is taken from each box without looking to it.
- Find the number of total possible pairs.
 - What is the probability that both are being even.
 - Find the probability that 'the product of numbers is an odd'.
 - Find the probability that 'the Product is an even number'.

- 15) Base area of square pyramid is 100 square centimetres and its lateral surface area is 260 square centimetres.
- Find the total surface area of the square pyramid.
 - Find the length of base edge.
 - Find the slant height.
 - Find the volume of square pyramid.

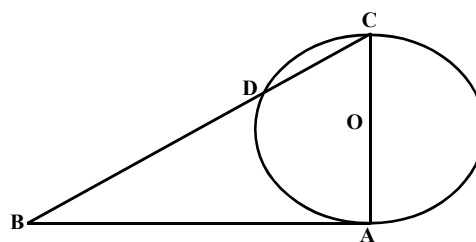
- 16) Algebraic expression of an arithmetic sequence is $8n - 4$.
- Find its first term.
 - Find its 10th term.
 - Find the sum of first 10 terms of the sequence.
 - Prove that, the sum of first continues terms of this sequence is a perfect square.

- 17) $P(x) = 2x^2 - 7x + k$
- Find $P(2)$
 - If $x-2$ is a factor of $P(x)$, then find k .
 - If $k = 7$, Is it possible to write $P(x)$ as the product of two first degree polynomials?
 - What should be the biggest natural number 'k' so that $P(x)$ can be write as two first degree polynomials?

- 18) Algebraic expression of sum of terms of an arithmetic sequence is $2n^2 + 5n$.
- Find its first term.
 - Find the sum of first 10 terms of this sequence.
 - How many terms from the first should be added to get the sum 900 ?

- 19) In Parallelogram ABCD, the side AB is pallel to X-axis. Co-ordinates of A is (5, 6) and length of AB is 7 units.
- Write co-ordinates of B.
 - If C is (15, 10), then find co-ordinates of D.
 - Find the length of AD.
 - Find the co-ordinates of the point of intersection of the diagonals AC and BD.

- 20) In the figure AC is the diameter of the circle and AB is the tangant. $BD = 16$ cm and $CD = 9$ cm.
- Find the length of BC.
 - Find the length of AB.
 - What is the measure of $\angle BAC$?
 - Find diameter of the circle.



- 21) Equation of a circle is $(x-3)^2 + (y-4)^2 = 25$
- Write the coordinates of the centre of the circle.
 - Find radius of the circle.
 - Find the coordinates of the point at which this circle cuts the 'Y' axis.

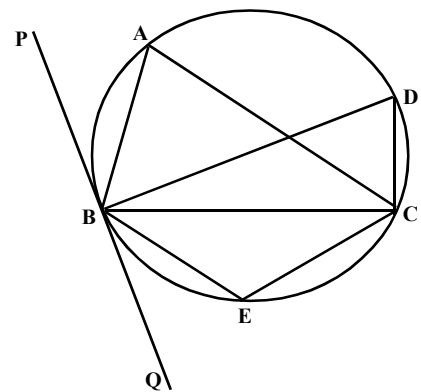
Answer any five questions from 22 to 28. Each question carries 5 marks.

[5x5 = 25]

- 22) (a) Find $1 + 2 + 3 + 4 + \dots + 20$.
 (b) Find the sum of first 20 terms of the arithmetic sequence 3, 6, 9, 12,
 (c) Find the sum of first 20 terms of the sequence 5, 8, 11, 14,
 (d) Find the 21st term of the arithmetic sequence 5, 8, 11, 14,
 (e) Find the difference between the sum of first 20 terms and the sum of next 20 terms of the arithmetic sequence 5, 8, 11, 14,
- 23) Draw a circle of radius 2.5 centimetres. Draw a triangle having two angles 50° , 60° and with all its sides are touching the circle.
- 24) (a) Radius of a hemisphere is 3 centimetres. Find its volume.
 (b) Radius of a sphere is 6 centimetres. Find its volume.
 (c) How many times will be the volume of a sphere to that of a hemisphere which has half the radius of this sphere?
 (d) 16 Metal hemispheres of radius 5 cm is melted and recast into a sphere. What is the radius of sphere?

25) In the figure A, B, C, D, E are points on a circle. BD is the diameter and PQ is a tangent at B. If $\angle BDC = 50^\circ$, $\angle PBA = 70^\circ$, then find the following angles:-

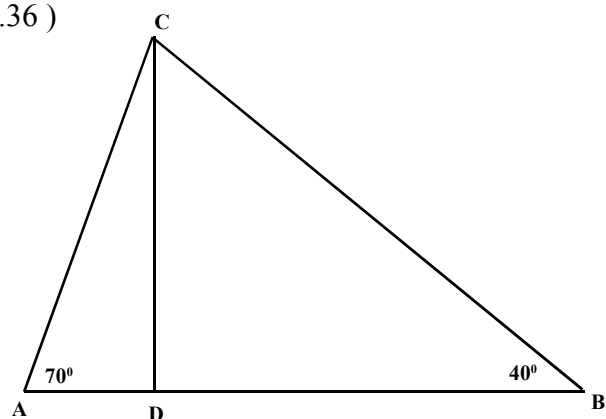
- (a) $\angle BCD$
 (b) $\angle BAC$
 (c) $\angle BEC$
 (d) $\angle ACB$
 (e) $\angle QBC$



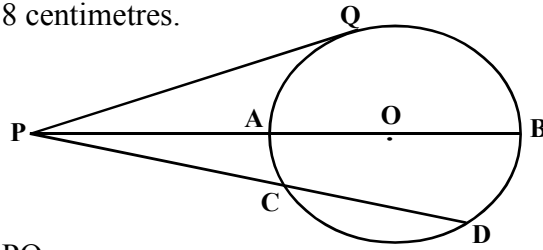
26) In triangle ABC $\angle A = 70^\circ$, $\angle B = 40^\circ$ and length of AB is 20 centimetres. CD is the perpendicular from C to AB. (a rough figure is given)

($\sin 40^\circ = 0.64$, $\cos 40^\circ = 0.77$, $\tan 40^\circ = 0.84$
 $\sin 70^\circ = 0.94$, $\cos 70^\circ = 0.34$, $\tan 70^\circ = 2.75$
 $\sin 50^\circ = 0.77$, $\cos 50^\circ = 0.64$, $\tan 50^\circ = 1.19$
 $\sin 20^\circ = 0.34$, $\cos 20^\circ = 0.94$, $\tan 20^\circ = 0.36$)

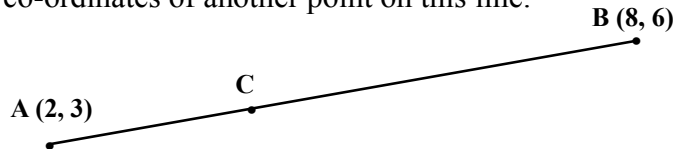
- (a) What is the measure $\angle ACB$
 (b) What is the length of BC?
 (c) Find CD and AC.
 (d) Find the area of traingle ABC.



- 27) In the figure the diameter AB and chord CD of circle are extended to meet at P. PQ is a tangent. If AB = 10 centimetres and PA = 8 centimetres.



- (a) Find PA x PB.
 (b) Find the Length of tangent PQ.
 (c) The length of chord CD is 2 centimetres less than PC. If PC = x, then what is CD?
 (d) Find the length of chord CD.
- 28) (a) A (2, 3), B (8, 6) are two points on a line.
 Write co-ordinates of another point on this line.



- (b) If C divides AB in the ratio 1: 2. Find the co-ordinates of C.
 (c) Write the equation of line AB.
 (d) Write the co-ordinates of the point of intersection of lines AB and $y = 5$.

Read the following mathematical idea and answer the questions that follow. Each carries one mark. [6x1 = 6]

- 29) Two number patterns are give below. The first pattern created by using natural numbers, 1, 2, 3,..... and the second pattern is using multiples of 4.

Pattern I	Pattern II
$1 + 2 = 3$	$4 + 8 = 12$
$4 + 5 + 6 = 7 + 8$	$16 + 20 + 24 = 28 + 32$
$9 + 10 + 11 + 12 = 13 + 14 + 15$	$36 + 40 + 44 + 48 = 52 + 56 + 60$
$16 + 17 + 18 + 19 + 20 = 21 + 22 + 23 + 24$
.....

The first number of the rows of first pattern are perfect squares. That is 1, 4, 9, 16,

- (a) Write the next row of 1st Pattern.
 (b) What is the first number of 5th row in second pattern?
 (c) What is the last number of 9th row in first pattern?
 (d) Write the first number of 10th row in second pattern.
 (e) If sum of 11 continues natural numbers is equal to sum of next 10 natural numbers, then which is the smallest number in it?
 (f) In an arithmetic sequence with common difference 4, the sum of first 12 terms is equal to the sum of next 11 terms. Find its first term.

