



# KARNATAKA ICSE SCHOOLS ASSOCIATION

Std. X - PREPARATORY EXAMINATION – 2022

Subject: MATHEMATICS

Time: 11.00 a.m. to 12.30 p.m.

Date : 04/ 04/ 2022

Max. Marks : 40

Time allowed: 1 ½ hours

Answers to this Paper must be written on the paper provided separately.

You will not be allowed to write during the first 10 minutes.

This time is to be spent in reading the question paper. The time given at the head of this Paper is the time allowed for writing the answers.

Attempt **all** questions from **Section A** and **any three** questions from **Section B**.

The intended marks for questions or parts of questions are given in brackets [ ]

## SECTION A

(Answer **all** questions from this section.)

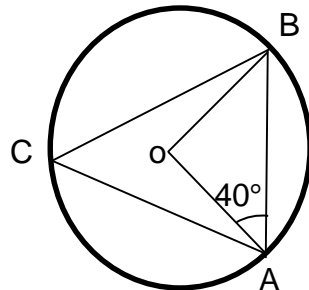
### Question 1

Choose the correct answers to the questions from the given options (Do not copy the questions, write the correct answer only) [10]

(i) The point  $(3, -2)$  is invariant under reflection in the line :

- a)  $x = -2$
- b)  $y + 2 = 0$
- c)  $y - 2 = 0$
- d)  $x + 3 = 0$

(ii) In the adjoining figure, O is the centre of the circle and  $AC = BC$ . If  $\angle OAB = 40^\circ$ , then  $\angle CAB$  is equal to :



- a)  $20^\circ$
- b)  $15^\circ$
- c)  $25^\circ$
- d)  $65^\circ$

(iii) A cylindrical roller 3 m in length and 0.5 m in radius, when rolled on a road was found to cover an area of  $6600 \text{ m}^2$ . Then, the number of revolutions made by the roller is :

- a) 100
- b) 300
- c) 700
- d) 1400

(iv) The point of intersection of the line segment joining AB, formed by the points A ( - 2, 5), B ( - 2, - 5) and its perpendicular bisector, lies on the :

- a) origin
- b)  $x$  - axis
- c)  $y$  - axis
- d) Third quadrant

(v)  $\frac{\cot^2 \theta}{1 + \cot^2 \theta}$  is equal to :

- a)  $\cos^2 \theta$
- b)  $2 \cos^2 \theta$
- c)  $\sin^2 \theta$
- d)  $2 \sin^2 \theta$

(vi) The lower limit of the median class for the given distribution is :

class interval	0 – 5	5 – 10	10 – 15	15 – 20
frequency	4	6	8	5

- a) 5
- b) 10
- c) 15
- d) 20

(vii) If the lines  $3x + 4y - 12 = 0$  and  $4x - Ky - 2 = 0$  are perpendicular to each other, then the value of 'k' is :

- a) - 3
- b)  $-\frac{3}{4}$
- c)  $\frac{4}{3}$
- d) 3

(viii) The volume of a cylinder is equal to the volume of a cone. If the radius of the cylinder is the same as that of the cone and the height of the cylinder is 9 cm, then the height of the cone is

- a) 3 cm
- b) 6 cm
- c) 18 cm
- d) 27 cm

(ix) The modal class for the given distribution is:

Marks obtained	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25
No. of Students	5	12	8	8	2

- a) 10 – 15
- b) 15 – 20
- c) 5 – 10
- d) 10 – 15 and 15 – 20

(x) The probability of an event cannot be:

- a)  $\frac{5}{2}$
- b) 0
- c) 0.5
- d) 25%

## SECTION B

(Attempt **any three** questions from this section)

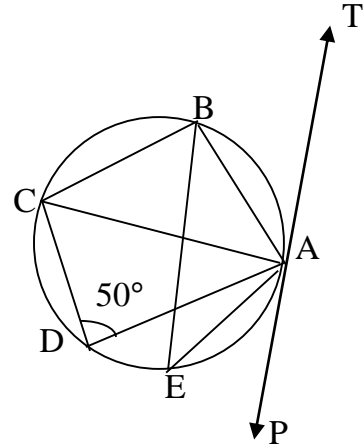
### Question 2

- (i) In what ratio is the line joining  $P (-3, 5)$  and  $Q (4, -9)$  divided by the point  $M (x, -5)$ ? Also find the value of  $x$

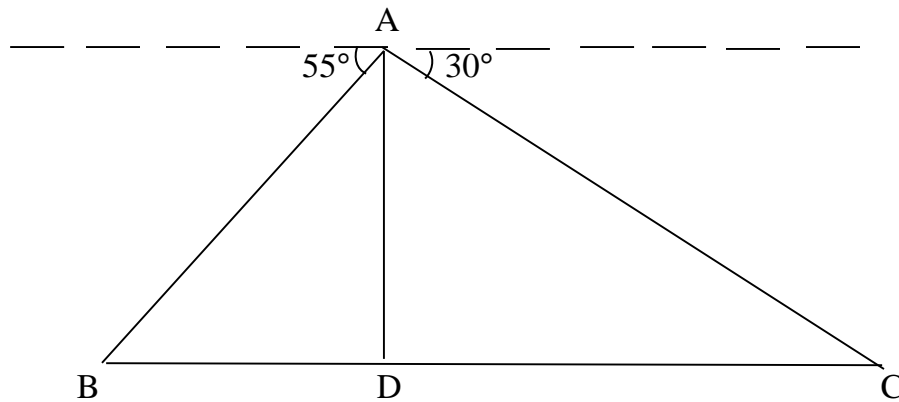
[2]

- (ii) Cards labelled a, b, c, d, ..., i, j, k are put in a box and shuffled. A child is asked to draw a card from the box. What is the probability that the card drawn is neither the letters of the word 'h i j a c k' nor a consonant ? [2]

- (iii) In the figure, PAT is tangent at A.  
If  $\angle ADC = 50^\circ$  and  $AB = BC$ , find :  
a)  $\angle ABC$   
b)  $\angle TAC$   
c)  $\angle AEB$  [3]



- (iv) From the top of a cliff 100 m high, the angles of depression of the top of two trees on opposite sides of it are  $55^\circ$  and  $30^\circ$  respectively. Find the distance between the two trees to the nearest metre. [3]



### Question 3

- (i) PA and PB are two tangents from an external point P to a circle with centre O and diameter 12cm. If,  $PA + PB = 16$  cm, find OP. [2]
- (ii) A right circular cone of height 21 cm and radius 6 cm is melted to make a right circular cylinder of same radius. Calculate the height of the cylinder. [2]

(iii) Prove that :

[3]

$$\frac{\tan \theta + \sec \theta - 1}{\tan \theta - \sec \theta + 1} = \frac{1 + \sin \theta}{\cos \theta}$$

(iv) Use a graph paper for the this question.

Take  $2 \text{ cm} = 10$  students along one axis and  $2 \text{ cm} = 5 \text{ cm}$  along other axis.

The following table shows height of 40 students in a class.

[3]

Height (in cms)	150 – 155	155 – 160	160 – 165	165 – 170	170 – 175
No. of students	5	11	12	8	4

Draw the Ogive for above distribution and hence estimate the median height.

#### Question 4

(i) Lines  $2x + 3y - 6 = 0$  and  $x - 3y - 3 = 0$  meet at point A. Find the equation of the line passing through point A and Point B (4, 3)

[2]

(ii) Find the mean of the following distribution.

[2]

Class interval	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
frequency	7	8	12	14	4

(iii) A right circular solid cone of maximum size is carved out of a right circular cylinder of diameter  $14 \text{ cm}$  and volume  $3696 \text{ cm}^3$ . Find the curved surface area of the cone. [3]

(iv) Use a graph paper for this question. Take  $2 \text{ cm} = 1 \text{ unit}$  along both the axis.

[3]

(a) Plot the points A (0, 4) and B (4, 0)

Reflect A on the line  $y = 0$  to  $A'$ . Write the coordinates of  $A'$

(b) Reflect the Point B on the line  $x = 0$  to  $B'$ . Write the coordinates of  $B'$

(c) Name the closed figure  $ABA'B'$

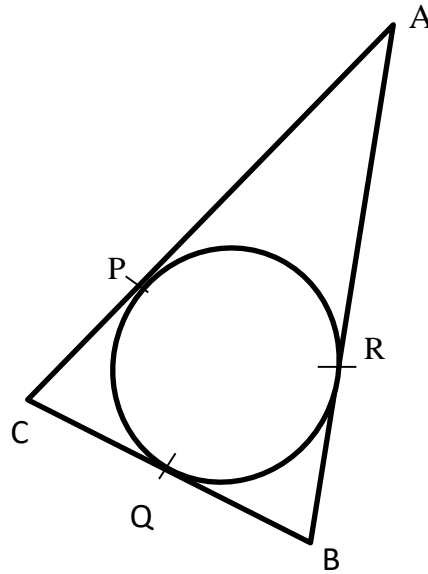
### Question 5

- (i) In the given figure, the sides of the  $\Delta ABC$  touches the circle at  $P, Q$  and  $R$ . [2]

If  $AB = 24 \text{ cm}$ ,

$BC = 15 \text{ cm}$

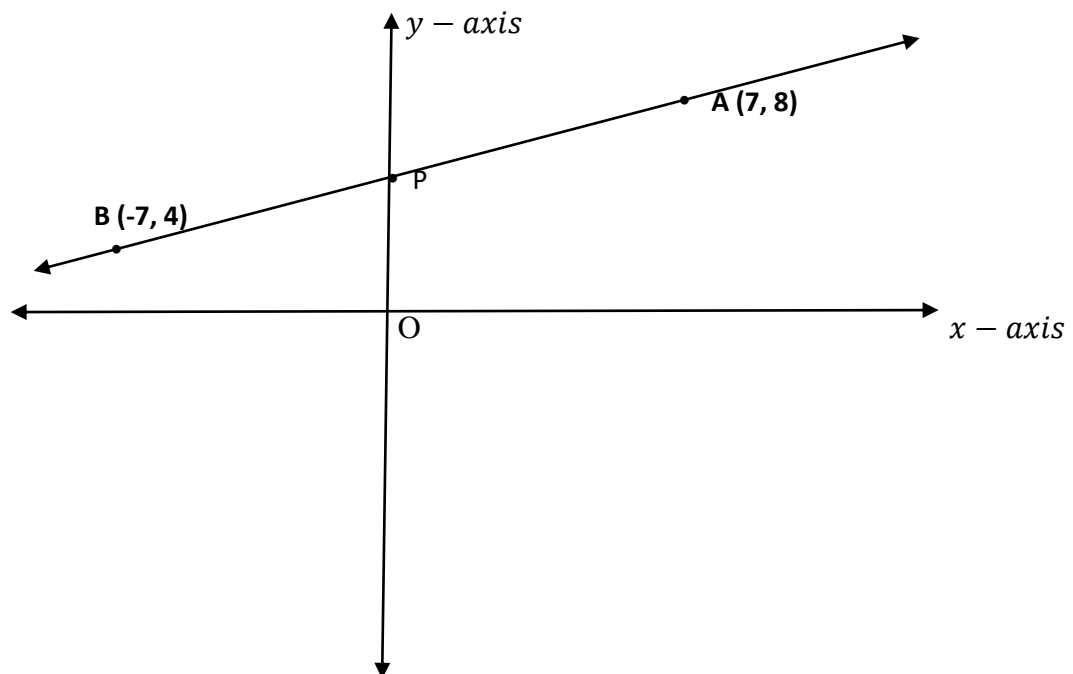
$AC = 17 \text{ cm}$ , find the length of  $BR$



- (ii) Prove that: [2]

$$\frac{(\sin A - \cos A)^2}{\cos A} = \sec A - 2 \sin A$$

- (iii) In the figure given below, P is the midpoint of AB. Find the equation of a line which passes through 'P' and whose slope is  $\frac{1}{3}$  [3]



- (iv) Using Histogram find the mode of the following data. [3]

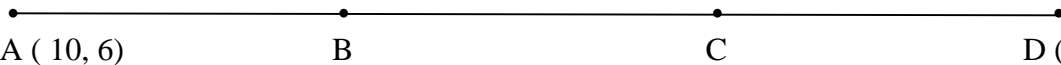
Take 2 cm = 10 units on both axis

Class interval	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Frequency	18	26	12	18	24

### Question 6

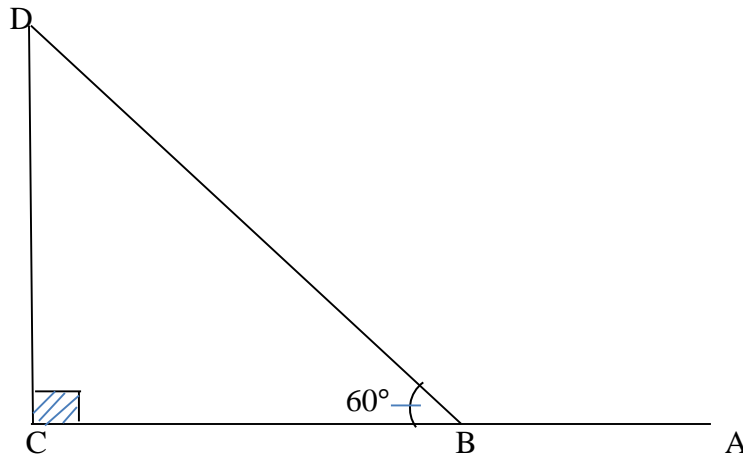
- (i) A ticket centre has tickets numbered from 3 to 42. If one ticket is selected at random, find the probability of getting :

- a) a number not divisible by both 3 and 4  
b) a number which is a factor of 24 [2]

- (ii)  [2]

In the figure given above, **B** and **C** are the points of trisection of the line segment **AD**, find the co-ordinates of **B**. [2]

- (iii) A boat travelling from 'A' to 'B' at a speed of 60 kmph reaches point 'B' in 10 minutes. At point 'B', the angle of elevation to the top of the cliff (DC) 900 m high is  $60^\circ$ . Find the total distance covered from point A to C (to the nearest metre) [3]



- (iv) Given that the mean of the following distribution is 60, find the missing frequency ' $f$ ' [3]

Class interval	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
Frequency	6	4	9	$f$	10