HUB Academy
Humanity - Versatility - Brilliance

Preliminary Examination, January - 2022

SUBJECT: MATHEMATICS

Std.: X

Date: 10 - 01 - 2022 **Duration: 1 hour 30 min.** **Max. Marks: 40**

Roll No. _____ **Name: _____**

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 the parts of questions are given in brackets [ ].

SECTION A

*(Attempt **all** questions from this Section.)*

Question 1

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

i. If a coin is tossed once, the probability of getting two tails will be:

a) 1

b) 0

c) $\frac{1}{2}$

d) $\frac{1}{3}$

ii. $\cot\theta \times \sqrt{1 - cos^2\theta}$:

a) cos θ

b) sin θ

c) tan θ

d) cosec θ

iii. If the lines 3x – 5 = 2y and 2x +ay + 7 = 0 are parallel, then the value of a is :

a) 0

b) 3

c) $\frac{4}{3}$

d) $\frac{-4}{3}$

iv. The centroid of a triangle whose vertices are (-2, 4), (1, -3) and (4, -4) will be:

a) (0, 0)

b) (1, -1)

c) (1, 0)

d) $\left(\frac{7}{3}, \frac{11}{3}\right)$

v. If the co-ordinates of the image of a point P when reflected in the origin are (- 3, 5), then the co-ordinates of P are :

a) (- 3, 5)

b) (3, 5)

c) (3, - 5)

d) (- 3, - 5)

vi. The mean of natural numbers between 3 to 12 is :

a) 7

b) 7.5

c) 8

d) 8.5

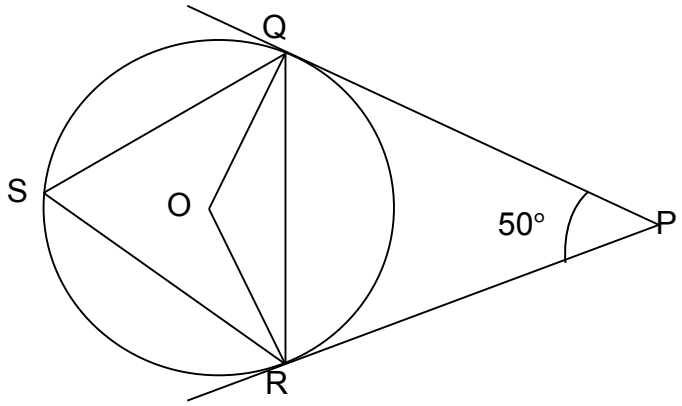
vii. In the figure, PQ and PR are tangents to the circle with centre O. If $\angle QPR = 50^{\circ}$, then $\angle QOR$ will be :

a) 130^0

b) 120^0

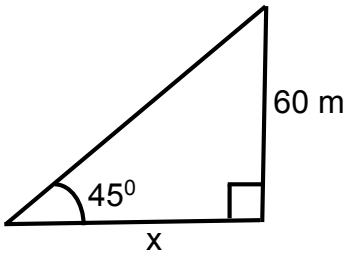
c) 90^0

d) 100^0



viii. From the given figure, the value of x will be :

a) 30 m
b) 90 m
c) 45 m
d) 60 m



ix. The volume of a cone is 120 cm^3. The volume of the cylinder having same radius and height as that of the cone given is :

a) 80 cm^3
b) 240 cm^3
c) 360 cm^3
d) 660 cm^3

x. The median of 1, 6, 4, 3, 8, 2, 9 and 5 is:

a. 4
b. 4.5
c. 5
d. 5.5

SECTION B

*(Attempt **any three** questions from this Section.)*

Question 2.

A. A fair dice is rolled once. Workout the probability of:

a. getting a number less than 5.
b. getting a prime number **[2]**

B. Prove that: $\frac{\sin A}{\cos A} + \frac{\cos A}{\sin A}$ = sec A cosec A **[2]**

C. Find the equation of the straight line perpendicular to the line 2y – 3x = 4 and passing through (2, 1). **[3]**

D. The mean of the following data is 16. Calculate the value of f. **[3]**

Marks	5	10	15	20	25
No. of Students	3	7	f	9	6

Question 3.

A. Find the volume of the right circular cone with radius 3.5 cm, height 12 cm. **[2]**

B. Find the co-ordinates of the image of (3, 1) under reflection in x-axis followed by a reflection in origin. **[2]**

C. The mid-point of the line segment joining the points A(3, 4) and B(k, 6) is P(x, 10 - x). Find the value of k. **[3]**

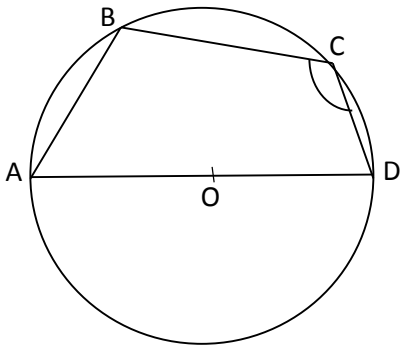
D. Represent the following data by means of a histogram and find the Mode of the data:

Marks	10-20	20-30	30-40	40-50	50-60
No. of Students	6	9	16	13	4

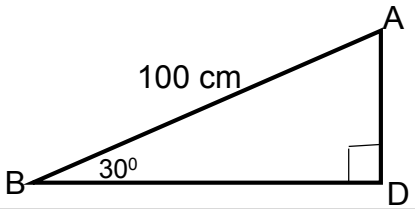
[3]

Question 4.

A. In the given figure, AD is diameter of the circle with centre 'O'.
If $\angle$ BCD = 135^0,
Calculate $\angle$ DAB. **[2]**



B. Find AD in the given figure: **[2]**



C. The mean of the following distribution is 52. Determine the value of p. **[3]**

Marks Obtained	10 - 20	20 - 30	30 - 40	40 - 50	50 – 60	60 - 70	70 - 80
No. of Students	5	3	4	*p*	2	6	13

D. Prove that: $\frac{\cos^2 A + \tan^2 A - 1}{\sin^2 A} = \tan^2 A$ **[3]**

Question 5.

A. The following numbers are given in descending order:

68, 60, 52, x – 3, x – 8, x – 11, 30, 25, 22 and 20.

If the median of the numbers is 39, find the value of x. **[2]**

B. The height of a circular cylinder is 75 cm and radius of its base is 10.5 cm. Find the curved surface area. **[2]**

C. Calculate the ratio in which the line joining A (6, 5) and B (4, - 3) is divided by the line y = 2. **[3]**

D. The line passing through (0, 2) and (-3, -1) is parallel to the line passing through (-1, 5) and (4, a). Find a. **[3]**