BALDWIN GIRLS' HIGH SCHOOL, BENGALURU

STD X SEMESTER2 MODEL EXAMINATION, FEBRUARY – 2022

SUBJECT: MATHEMATICS

MAX MARKS: 40

TIME: One and a half 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.

All working, including rough work, must be clearly shown and must be done on the same sheet as the rest of the answer. Omission of essential working will result in the loss of marks.

The intended marks for questions or 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)

(i) The points (2,0) and (-3,0) are invariant points under reflection in the line L. Equation of the line L is: [1]

(a) X = 0

(b) Y = 0

(c) X = 2

(d) Y = -3

(ii) A solid right circular ~~cone~~ cylinder has a radius of 10 cm and its height is 42 cm. The curved surface area of the cylinder is: [1]

(a) 2640 cm^2

(b) 2460 cm^2

(c) 2046 cm^2

(d) 2064 cm^2

(iii) $\text{cosec}^2A + \sec^2A =$ [1]

(a) $\text{cosec}^2A + \sin^2A$

(b) $\tan^2A\cot^2A$

(c) $\tan^2A + \cot^2A$

(d) $\text{cosec}^2A\sec^2A$

(iv) The mid-point of the line joining the points (-4,6) and (8, -2) is [1]

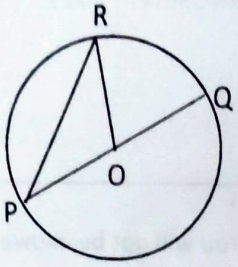
(a) (4,4)

(b) (6,8)

(c) (-4, -2)

(d) (2,2)

(v))In the figure given below, O is the centre of the circle and ∠QOR = 66°. ∠OPR =



(a) 33°
(b) 132°
(c) 99°
(d) 66°

*(vi)*The distribution given below shows the marks obtained by 24 students in an aptitude test. [1]

Marks obtained	5	6	7	8	9
No. of students	3	9	6	4	2

The Median of the given distribution is:

(a) 24
(b) 12
(c) 6.5
(d) 18

*(vii)*The Slope of the side AB of a rectangle ABCD is 5. Slope of the side CD is: [1

(a) 2.5
(b) 1.0
(c) 5
(d) -5

*(viii)*The curved surface area of a solid cylinder is 2200 cm^2 and the circumference of its base is 110 cm. The height of the cylinder is: [1]

(a) 10 cm
(b) 20 cm
(c) 40 cm
(d) 30 cm

*(ix)*The modal class for the following distribution is: [1]

Class Interval	0-10	10-20	20-30	30-40	40-50
Frequency	5	12	20	9	4

(a) 10-20
(b) 20-30
(c) 30-40
(d) 40-50

*(x)*A card is drawn at random from a well shuffled deck of playing cards. What is the probability of getting a Jack? [1]

(a) 1/13
(b) 4/13
(c) 1/52
(d) 1/4

SECTION B

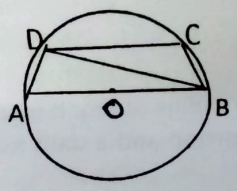
*(Attempt **any three** questions from this Section)*

Question 2

*(i)*The line segment AB joining the points A (-4,6) and B (8, -3) is divided by the y-axis. Find: [2]
(a) the ratio in which AB is divided by the y-axis
(b) the co-ordinates of the point of intersection.

*(ii)*A bag contains 5 red, 4 blue and 3 green marbles. One marble is drawn at random. Find the Probability that the marble drawn is: [2]
(a) Either red or green
(b) Not red

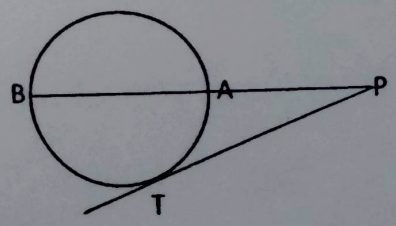
*(iii)*ABCD is a cyclic quadrilateral in a circle with centre O. If $\angle BCD = 110^0$, find $\angle ABD$. [3]



*(iv)*The angles of elevation of the top of a tower from the points A and B on the ground, are observed to be 30^0 and 60^0 respectively. Find the distance between A and B, correct to the nearest meter, if the height of the tower is 10m. [3]

Question 3

*(i)*In the given figure below, PA = 4 cm and the length of the tangent PT = 8 cm. Find the length of AB. [2]



*(ii)*A solid cone of radius 10 cm and height 20 cm is melted and recast into a few identical smaller cones. Find the number of smaller cones, if the smaller cones have a radius of 5 cm and a height of 10 cm. [2]

(iii) Prove that $\sqrt{\frac{1+Sin^2\theta.Sec^2\theta}{1+Cos^2\theta.Cosec^2\theta}} = Tan\theta$ [3]

*(iv)*Use a graph paper to answer this question. [3]

The table given below shows the distribution of daily wages, earned by 160 workers in a factory.

Wages in ₹ Per day	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of workers	12	20	30	38	24	16	12	8

(a)Draw an Ogive for the above distribution. Take 2 cm = ₹ 10 along one axis and 2 cm = 20 workers along the other axis.

(b)Use the Ogive to find the median wage.

Question 4

*(i)*Find the value of 'x', if the line through (2, -5) and (-2, 5) is perpendicular to the line joining (x, 3) and (1,1). [2]

*(ii)*Find the mean of the following distribution. [2]

x	5	10	15	20	25	30
f	6	4	6	12	8	4

*(iii)*A tent is in the shape of a cylinder up to a height of 20 m, with base radius of 5m. It is surmounted by a conical shape having the base radius, same as the cylindrical portion and a slant height of 16m. Find the total surface area of the tent. [3

*(iv)*Use a graph sheet to answer this question. Take 2 cm = 1 unit along both axes. [3

(a) Plot A (-3, 0) and reflect it in the line x = 0, to get its image A'. Write the co-ordinates of A'.

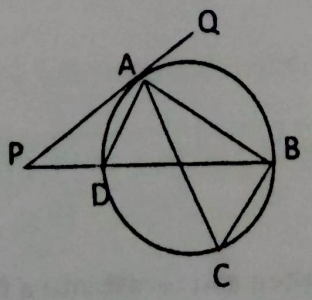
(b) Plot B (0, 2) and reflect it in the line Y = 0, to get its image B'. Write the co-ordinates of B'.

(c) Name the geometrical figure ABA'B'.

Question 5

*(i)*In the figure given below, PQ is a tangent to the circle at A. ∠PAD = 40° and ∠ACB = 60°. [

Find: (a) ∠ABD (b) ∠ADB



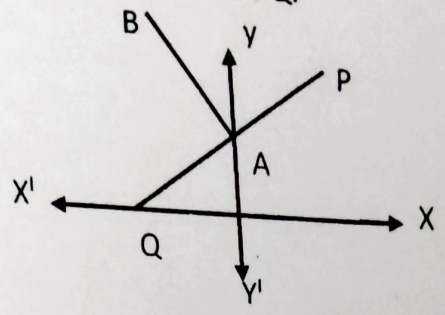
*(iii)*Prove that $\frac{1-SinA}{1+SinA} = (SecA - TanA)^2$

*(iii)*In the diagram given below, equation of PQ is $x-\sqrt{3}y+1=0$. [3]

(a)Find the angle that PQ makes with the x-axis in the positive direction

(b)the co-ordinates of A

(c)Equation of AB, if it is perpendicular to PQ.



*(iv)*Use a graph paper to answer this question. [3]

Draw a histogram for the following frequency distribution and use the same to find the mode.

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	5	15	10	5	12	8

Take 2 cm = 10 marks on one axis and 2 cm = 5 students on the other axis.

Question 6

*(i)*A box contains cards numbered from 1 to 20. A card is draw at random. Find the probability that the Card drawn bears:

(a) A prime number

(b) A factor of 20

[2]

*(ii)*The line segment PQ intersects x-axis at P and y-axis at Q. A (3, 1) is a point on PQ such that PA = AQ. Find the co-ordinates of P and Q. [2]

*(iii)*A man in a boat rowing away from a light house 150 m high, takes 2 minutes to change the angle of elevation of the top of the lighthouse from 60^0 to 45^0. Find the speed of the boat. [3]

(iv) The mean of the following distribution is 52. Find the value of P. [3]

Class Interval	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	5	3	P	7	2	6	13

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