SMT. RAMDEVI SOBHRAJ BAJAJ ARYA VIDYA MANDIR

Std. X **PRE PRELIMINARY REVIEW – JANUARY, 2021** **Marks: 80**
Math **MATHEMATICS** **Time: 2 ½ hrs**
Date: 15.01.2021

Answers to this paper must be written on the paper provided separately. You will not be allowed to write during the first 15 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.

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*Attempt all questions from **Section A** and any four 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 [ ].
*This paper consists of **6** printed pages.*

Please ensure the following:-

- It is suggested to attempt the Pre Preliminary Review using only a Laptop or a Desktop (with a webcam). In case a mobile or tab is being used, please have an alternate device with a camera so that you are visible to the invigilator at all times.
- Camera must be kept on during the entire paper.
- Pre preliminary paper comprises two sections i.e. Section-A and Section-B. Each section will have to be uploaded separately in the space provided in the form with the necessary renaming of the file as mentioned in the form.

If students encounter any problem accessing or submitting the review, he/she must inform the invigilator.

SECTION I (40 marks)
(Attempt all questions from this section)

Question 1

a) An A.P. consists of 50 terms of which the third term is 12 and the last term is 106. Find the 29^{th} term. [3]

b) Solve the following inequation and represent the solution set on the number line ;

$2x - 3 < x + 2 \leq 3x + 5; x \in R$ [3]

c) Mr Gupta has a cumulative deposit account of Rs 400 per month at 10% p.a. simple interest. If she gets Rs 30100 at the time of maturity, find the total time for which the account was held. [4]

Question 2

a) If $P = \begin{bmatrix} 1 & 1 \\ 8 & 3 \end{bmatrix}$. Find matrix X if $X = P^2 - 4P$. Hence,solve for a and b given [3]

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$$X \begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 5 \\ 50 \end{bmatrix}$$

b) A single die is rolled. Find the probability of getting [3]
i) A prime number
ii) Multiple of 2 or 3
iii) A number less than 8

c) The following table shows the expenditure of 60 boys on books. Find the mode expenditure. [4]

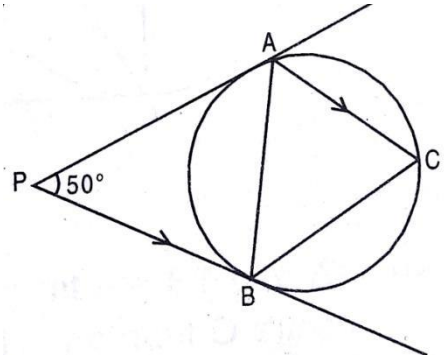
Expenditure(Rs)	No. of Students
20 - 25	4
25 - 30	7
30 - 35	23
35 - 40	18
40 - 45	6
45 - 50	2

Question 3

a) The line segment joining A (2,3) and B (6,-5) is intersected by the X-axis at point K. Write down the co-ordinates of K. Hence find the ratio in which K divides AB. [3]

b) Prove the following identities :
(cosec A - sin A) (sec A - cos A) (tan A +cot A) =1 [3]

c) PA and PB are two tangents of a circle. AC is parallel to PB. Find the ∠ACB and ∠BAC [4]



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Question 4

a) Given that 2 is a root of the equation $3x^2 - p(x+1) = 0$ and that the equation $px^2 - qx + 9 = 0$ has equal roots. Find the values of p and q. [3]

b) A circus tent is cylindrical to a height of 4 m and conical above it if its diameter is 105 m and its slant height is 80 m. Calculate the total area of canvas required. Also, find the total cost of canvas used at Rs 15 per meter if the width is 1.5 m [3]

c) Find the amount of bill inclusive of GST for the following intra-state transaction of goods/services. The GST rate is 5%. [4]

Quantity	MRP of each item(Rs)	Discount %
18	150	10
24	240	20
30	100	30
12	120	20

Section II (40 marks)

(Attempt any **four** questions from this section.)

Question 5

a) If $\frac{a^3 + 3ab^2}{3a^2b + b^3} = \frac{x^3 + 3xy^2}{3x^2y + y^3}$ prove that $\frac{x}{a} = \frac{y}{b}$ [3]

b) A jar contains 81 balls each of which is red, blue or green. The probability of selecting a red ball is 1/3 and that of blue is 4/9. How many green balls does the jar contain? [3]

c) Use a graph paper for this question. Plot the points P(3,2) and Q(-3,-2), From P and Q, draw perpendiculars PM and QN on the X-axis [4]

i) Name the image of P on reflection in the origin.

ii) Assign the special name to the geometrical figure PMQN and find its area.

iii) Write the co-ordinates of the points to which M is mapped on reflection in:

i) X- axis ii) Y-axis iii) origin

Question 6

a) Mr Shah needs Rs 16509 after 36 months. How much money does he should invest per month in a recurring deposit scheme to get the required amount, when the rate of interest is 9.5 % p.a. ? [3]

…4

b) If the mean of the following data is 21, find the value of 'P' [3]

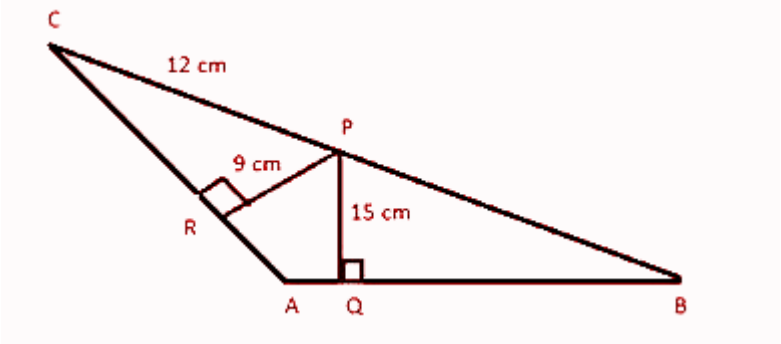
x	10	15	20	25	35
f	6	10	P	10	8

c) ABCD is a parallelogram where A(x,y), B(5,8), C(4,7), D(2,-4). Find [4]
i) Coordinate of A
ii) Equation of Diagonal BD

Question 7

a) P and Q are two points on the opposite sides of a 90 m high tower AB the base B of the tower AB and points P and Q are along the same straight line, the angles of depression of points P and Q as observed from top A of tower AB are 60^o and 30^o respectively. Find the distance between P and Q correct to the nearest meter. [3]

b) Angle BAC of triangle ABC is obtuse and AB = AC. P is a point in BC such that PC = 12 cm. PQ and PR are perpendiculars to sides AB and AC respectively. If PQ = 15 cm and PR = 9 cm; find the length of PB. [3]



c) A bus covers a distance of 240 km at a uniform speed. Due to heavy rain its speed gets reduced by 10 km/hr and as such it takes two hrs longer to cover the total distance. Assuming the uniform speed to be'x' km/hr form an equation and solve it to evaluate 'x'. [4]

Question 8

a) Factorise: $2x^3 - 5x^2 - 8x + 20$ using remainder theorem. [4]

b) The monthly income of a group of 320 employees in a company is given below: [6]

Monthly Income	No of Employees
6000-7000	20
7000-8000	45
8000-9000	65
9000-10000	95
10000-11000	60
11000 -12000	30
12000 -13000	5

…5

Draw an ogive taking 2cm=Rs 1000 on one axis and 2 cm =50 employees on other axis. From the graph determine :
i) The median wage.
ii)No. of employees whose income is below Rs 8500
iii) The upper quartile.

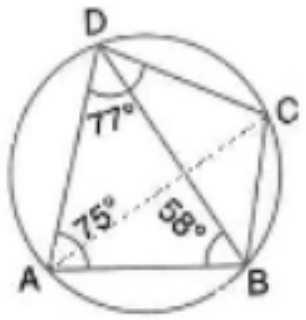
Question 9

a) What number must be subtracted from $16x^3 - 8x^2 + 4x + 7$ so that the resulting polynomial has $2x + 1$ as a factor? [3]

b) Given $x = \frac{\sqrt{a^2 + b^2} + \sqrt{a^2 - b^2}}{\sqrt{a^2 + b^2} - \sqrt{a^2 - b^2}}$.

Use componendo and dividendo to prove that $b^2 = \frac{2a^2x}{x^2 + 1}$. [3]

c) Find (i)∠ BDC (ii)∠BCD (iii)∠BCA [4]



[3]

Question 10

a) Solve the following inequation and represent the solution set on the number line where $x \in W$ [3]

$$-2\tfrac{1}{2} + 2x \leq \frac{4x}{5} \leq \frac{4}{3} + 2x$$

b) The lower window of a house is at a height of 2 m above the ground and its upper window is 4 m vertically above the lower window. At a certain instant the angles of elevation of a balloon from these windows are observed to be 60^o and 30^o respectively. find the balloon above the ground. [3]

c) A solid cylinder of silver 9 cm high and 4 cm in diameter is melted and recast into a right circular cone of diameter 6 cm. Find the height and the total surface area of the cone. Give your answer correct to 3 significant figures.(take $\prod$ =3.14) [4]

..6

Question 11

a) If $A = \begin{bmatrix} 3 & a \\ -4 & 8 \end{bmatrix}, B = \begin{bmatrix} c & 4 \\ -3 & 0 \end{bmatrix}, C = \begin{bmatrix} -1 & 4 \\ 3 & b \end{bmatrix}$ [3]

and 3A - 2C = 6B. Find the values of a,b and c.

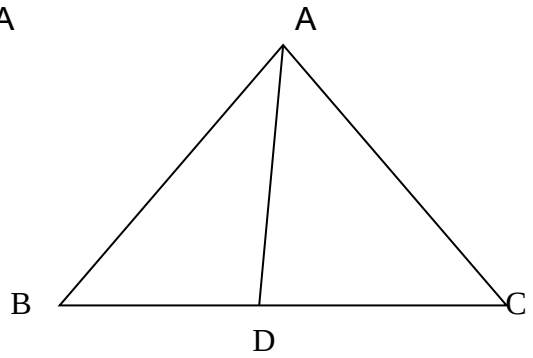
b) (sin A +cos A)(sec A + cosec A)=2 + sec A cosec A [3]

c) In Δ ABC, $\angle$ ABC =$\angle$ DAC.AB =16cm,AC =8 cm, AD =10cm. [4]

i) Prove that Δ ACD is similar to Δ BCA

ii) Find BC and CD

iii) Find area of Δ ACD : area of Δ ABC



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