R. I. C. S. E.

SECOND PRE-BOARD EXAMINATION 2018-2019

STD. : X | MARKS: 80

SUB. : MATHEMATICS | TIME: 2½ HRS.

INSTRUCTIONS:

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

All questions are compulsory in Section A and attempt any four questions in Section B.

All working must be clearly shown and must be done on the same sheet as the rest of the answers. Omission of essential working will result in loss of marks.

SECTION - A : [40 Marks]

All questions are compulsory

Question I.

1. Hari has a recurring deposit account in a bank for 2 years at 6% p.a. simple interest. If he gets ₹ 1200 as interest at the time of maturity, find:

   a) the monthly installment

   b) the amount of maturity [3]

2. Show that (x-1) is a factor of $x^3 - 7x^2 + 14x - 8$. Hence completely factorise the above expression. [4]

3. Solve the following inequation and represent the solution set on the number line.

   $$-3 < -\frac{1}{2} - \frac{2x}{3} \leq \frac{5}{6}, x \in R$$ [3]

Question II.

1. Without solving the following quadratic equation find the value of p for which the given equation has real and equal roots: [3]

   $$x^2 + (p-3)x + p = 0$$

2. P(3, 4) , Q(7, -2) and R(-2, -1) are the vertices of triangle PQR. Find the equation of the median of the triangle through P. [4]

3. Determine x and y if: [3]

$$\begin{bmatrix} 3 & -2 \\ -1 & 4 \end{bmatrix}\begin{bmatrix} 2x \\ 1 \end{bmatrix} + 2\begin{bmatrix} -4 \\ 5 \end{bmatrix} = \begin{bmatrix} 8 \\ 4y \end{bmatrix}$$

Question III.

1. Which term of the A.P 5, 15, 25, ... will be 130 more than its 31st term. [3]
2. Two dice are rolled together. Find the probability of getting: [4]
   a) an even number on one dice and a multiple of 3 on the other
   b) a total of atmost 10
   c) an even number as a sum
3. If a, b and c are in continued proportion prove that [3]

$$\frac{a^2-b^2}{a^2+b^2} = \frac{a-c}{a+c}$$

Question IV.

1. Give a line segment AB joining the points A(-4, 6) and B(8, -3). Find [3]
   a) the ratio in which AB is divided by the Y axis.
   b) the co-ordinates of the point of intersection
2. A Mathematics aptitude test of 50 students was recorded as follows; [4]

Marks	50-60	60-70	70-80	80-90	90-100
Number of students	4	8	14	19	5

Draw a histogram for the above data and find the mode and modal class.

3. Prove that: [3]

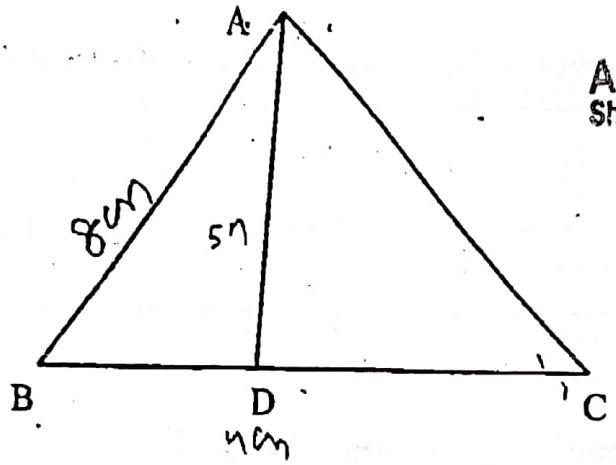
$$\sqrt{\frac{1+\cos A}{1-\cos A}} = \frac{\tan A + \sin A}{\tan A \sin A}$$

SECTION – B (40 Marks)
Attempt any 4 questions

Question V.

1. The 3rd term and the 6th term of a G. P are 24 and 192 respectively. Find the 10th term. [3]

2. In ΔABC, $\angle ABC = \angle DAC$, AB = 8cm, AC = 4cm , AD = 5cm



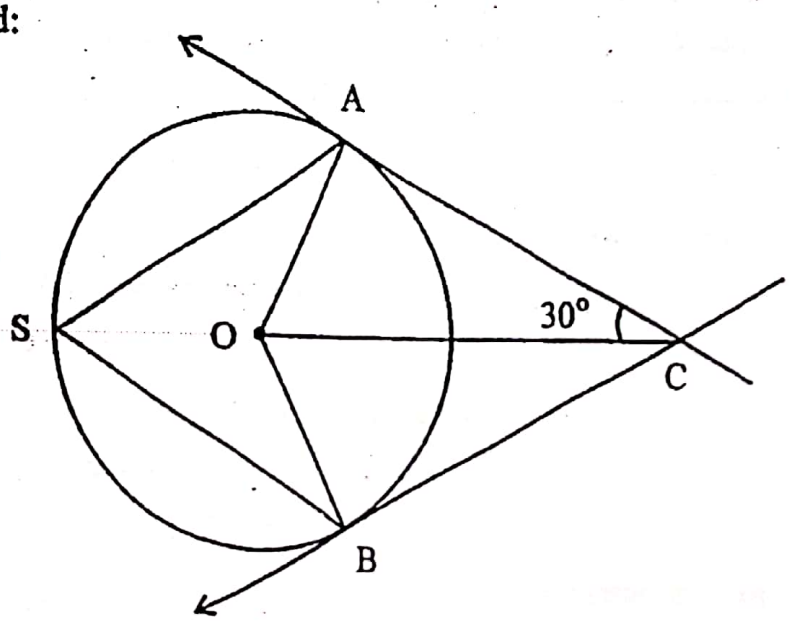
a) Prove that ΔACD is similar to ΔBCA
b) Find BC and CD
c) Find the area of ΔACD : area of ΔABC [4]

3. Find the equation of the line parallel to $3x - 4y + 6 = 0$ and passing through the midpoint of the line joining the points (2, 3) and (4, -1) [3]

Question VI.

1. In the given figure, O is the centre of the circle, Tangents at A and B meet at C. If $\angle ACO = 30°$, find: [3]

a) $\angle BCO$
b) $\angle AOB$
c) ~~$\angle APB$~~ $\angle ASB$



2. A man sold 500 shares of ₹ 20 each, paying 8% at ₹ 18 and invested the proceeds in ₹ 10 shares paying 12% at ₹ 15. How many ₹ 10 shares did he buy and what was the change in his annual income. [4]

3. A solid metal cylinder of diameter 28cm and height 42cm is melted down and recast into spheres of diameter 7cm. Calculate the number of spheres that can be made. [3]

Question VII.

1. The table shows the distribution of the scores obtained by 160 shooters in a shooting competition. Use a graph sheet and draw an ogive for the distribution

(take 1cm = 10 scores on X axis and 1 cm = 20 shooters on Y axis)

Scores	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Number of Shooters	9	13	20	26	30	22	15	10	8	7

Use the graph to estimate the following

a) The median

b) The interquartile range

c) The number of shooters who obtained a score of more than 85%. [6]

2. An aeroplane travelled a distance of 400km at an average speed of x km/hr. On the return journey the speed was increased by 40 km/hr. If the return journey took 30 minutes less than the onward journey write down an equation in x and find its value. [4]

Question VIII.

1. Solve the equation $2x - \frac{1}{x} = 7$ and write your answer correct to 2 significant figures. [3]

2. Given $\begin{bmatrix} 8 & -2 \\ 1 & 4 \end{bmatrix} \times M = \begin{bmatrix} 12 \\ 10 \end{bmatrix}$, find

a) The order of matrix M

b) The matrix M [4]

3. Determine how many terms of the G.P 1, 4, 16, 64, ... will make the sum 5461. [3]

Question IX.

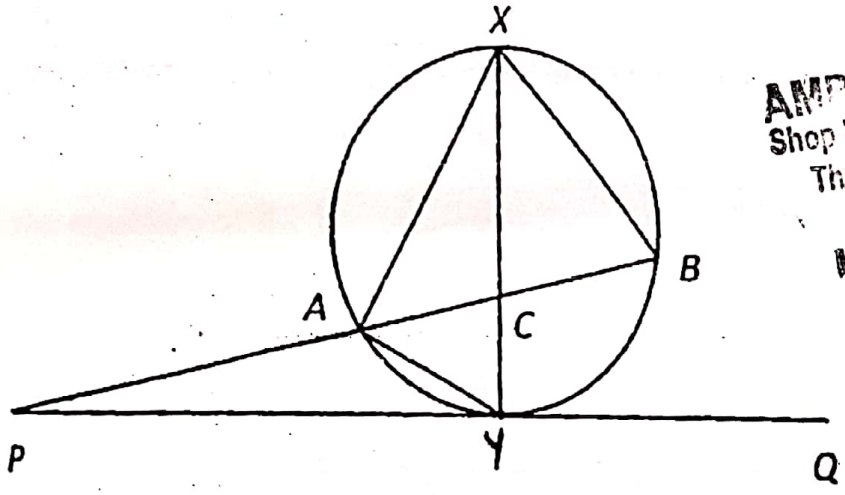
1. As observed from the top of a 80m tall lighthouse, the angles of depression of two ships on the same side of the lighthouse in horizontal line with its base are 30° and 40° respectively. Find the distance between the two ships. Give your answer correct to the nearest metre. [3]

2. Using properties of proportion solve for x: [4]

$$\frac{x^4+1}{2x^2} = \frac{17}{8}$$

3. In the given figure, XY is the diameter of the circle and PQ is a tangent to the circle at Y. If $\angle AXB = 50°$ and $\angle ABX = 70°$, find:

a) $\angle BAY$ and b) $\angle APY$ [3]



Question X.

1. Draw a circle of radius 4cm. Take a point at 6 cm from the centre of the circle. From point P, draw two tangents to the circle, and measure the length of each tangent. [3]

2. (x - 2) is a factor of the expression $x^3 + ax^2 + bx + 6$. When this expression is divided by (x - 3), it leaves the remainder 3. Find the values of a and b. [4]

3. Calculate the mean of the following distribution using short cut method. [3]

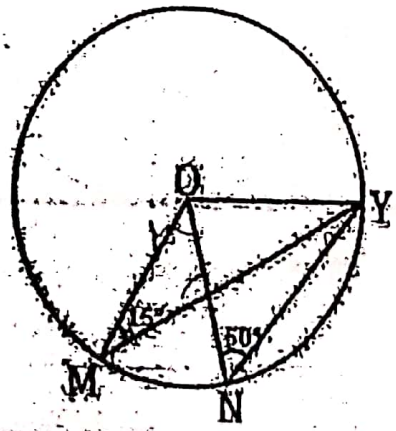
Marks	11-20	21-30	31-40	41-50	51-60	61-70	71-80
Number of students	2	6	10	12	9	7	4

Question XI.

1. The sum of first seven terms of an A.P is 182. If its 4^{th} and 17^{th} terms are in the ratio 1:5, find the A.P. [3]

2. Using a graph paper and taking 1cm = 1 unit along both the axis: [4]
   a) Plot points A(-4, 4) and B(2, 2)
   b) Reflect A and B in the origin to get the images A^1 and B^1
   c) Write down the co-ordinates of A^1 and B^1
   d) Give the geometrical name for the figure ABA^1B^1

3. In the given figure $\angle ONY = 50°$ and $\angle OMY = 15°$. Find $\angle MON$. [3]



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