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VIBGYOR HIGH

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First Preliminary Examination

2018-2019

MATHEMATICS

Grade: X | Max. Marks : 80

Date : 03/12/2018 | Time Allowed : 2½ hours

INSTRUCTIONS:-

- 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.
- The intended marks for the questions or parts of questions are given alongside the questions.
- 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.
- Geometrical figures to be constructed wherever applicable.
- For geometry, figures are to be copied to the answer script.

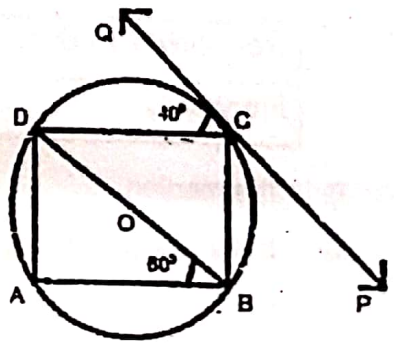
SECTION A [40 marks]

Attempt all questions from this section

Question 1

a) In the figure given below, ABCD is a cyclic quadrilateral and PQ is a tangent to the circle at C. If BD is a diameter, $\angle DCQ = 40°$ and $\angle ABD = 60°$, find the measures of:

i) $\angle DBC$ ii) $\angle BCP$ iii) $\angle ADB$. [3]



b) A hollow cylindrical copper pipe is 21 dm long. If its outer and inner diameters are 10 cm and 6 cm respectively, find the volume of copper used in making the pipe. [3]

[4]

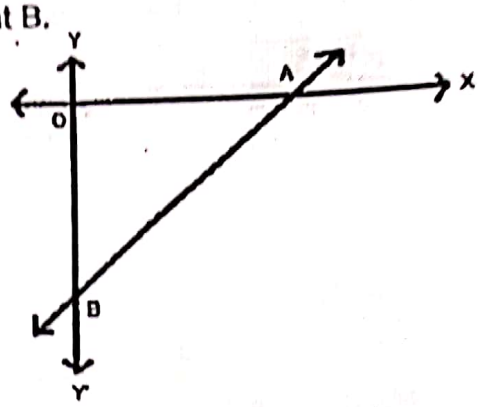
c) Line $3x - 4y = 18$ meets x-axis at A & y-axis at B.

Find:

i) the co-ordinates of A and B

ii) the slope of AB

iii) the area (ΔAOB)



Question 2

a) The first and the last terms of an A.P are (- 4) and 146 respectively and the sum of the A.P is 7171. Find the number of terms in the AP and the common difference. [3]

b) Prove that [3]

$$\tan^2 A - \tan^2 B = \frac{\sin^2 A - \sin^2 B}{\cos^2 A \cdot \cos^2 B}$$

c) A map is drawn to a scale of 1: 50,000 [4]

i) An airport runway is represented by a line of length 4.6 cm on the map. Calculate the actual length of the runway in km.

ii) The actual area of the airport is $3.5 km^2$. Calculate the area of the airport on the map in cm^2.

Question 3

a) A man gets ₹ 4,956 at the end of 1 year at the rate of 6% p.a. in a Recurring Deposit Account. Find his monthly installment. [3]

b) A fair dice is rolled 29 times. The results are shown in the table below.

Find:

No. shown on dice	1	2	3	4	5	6
Frequency	8	7	4	3	4	3

i) the median

ii) If the dice is thrown one more time, find the number shown on the dice if the mean is exactly 3. [3]

c) The time taken by a person to cover 150 km was 2.5 hours more than the time taken in the return journey. On the return journey, the speed was increased by 10 km/hr. What was the speed per hour in each direction? [4]

Question 4

a) Solve the following inequation and represent it on the number line:

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

b) Anupama invests ₹ 3240 in buying ₹ 50 shares of a company giving a dividend of 12%. At the end of the year she received ₹ 288 as dividend. At what price did she buy the shares? [3]

c) Three numbers are in G.P such that their product is 216 and the sum of the products of each pair of numbers is 156. Determine the numbers. [4]

SECTION B [40 marks]

Attempt any four questions from this section

Question 5

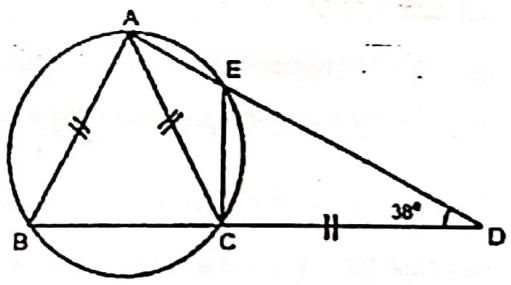
a) If $\frac{m^4+9}{6m^2} = \frac{5}{3}$, using properties of proportion solve for m. [3]

b) In the given figure AB = AC = CD and $\angle ADC = 38^0$. [3]

Calculate:

i) $\angle ABC$

ii) $\angle BEC$



c) A boy is flying a kite with a string of length 80 m. The angle of elevation of the kite is found to be 30°. On the other side of the kite, a girl standing near the window at a height of 16 m observed that the angle of elevation of the kite is 60°. Find the distance between the girl and the kite. Give the answers in three significant figures. [4]

Question 6

a) If, $A = \begin{bmatrix} 4 & -2 \\ 6 & -3 \end{bmatrix}$ $B = \begin{bmatrix} 0 & 2 \\ 1 & -1 \end{bmatrix}$ and $C = \begin{bmatrix} -2 & 3 \\ 1 & -1 \end{bmatrix}$

Find $A^2 - 4A + BC$. [3]

b) A card is drawn from a well-shuffled deck of 52 cards. Find the probability that the card drawn is:

i) neither a king nor a queen

ii) a card of spade or an ace

iii) non-face card of red colour. [3]

c) The daily wages of 160 workers in a building project are given below:

Wages (in Rupees)	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

Using a graph paper, draw an ogive for the given distribution. Use your ogive to estimate:

i) median wages of the workers.

ii) the percentage of the workers who earn more than ₹ 45 a day. [4]

Question 7

a) Construct a triangle PQR in which base QR = 6 cm, PQ = 5.5 cm and ∠PQR = 120°. [3]

i) Construct a circle circumscribing the triangle PQR.

ii) Draw a cyclic quadrilateral PQRS so that S is equidistant from Q & R.

b) A child saved ₹ 5 in the first week of the year and then increased the weekly savings by ₹ 1.75 each week. In which week will the weekly savings of the child be ₹ 20.75? [3]

c) Mr. Verma invests ₹ 9600 in 5%, ₹ 100 shares at ₹ 80. After a year he sold those shares at ₹ 90 each and invested the proceeds (including his dividend) in 9%, ₹ 50 shares at ₹ 57. Calculate:

i) his dividend for the first year.

ii) sales proceeds (including dividend).

iii) percentage increase in his return on his original investment. [4]

Question 8

a) Draw a circle of radius 4 cm. Draw two tangents to this circle, so that the angles between the tangents is 45°. [3]

b) ST is a diameter of a circle. Given S = (7,-4) & T = (-9,8) [3]

i) Find the co-ordinates of the centre O.

ii) If PQ is another diameter of the circle & P = (1, 4), find the co-ordinates of Q.

c) Using factor theorem, show that (t+6) is factor of $2t^3+17t^2+23t-42$. Hence factorise the expression $2t^3+17t^2+23t-42$ completely. [4]

Question 9

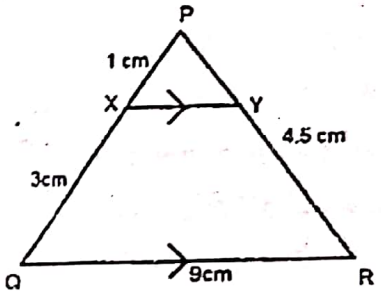
a) Draw a histogram for the following data and estimate the mode. [3]

Class Marks	12.5	17.5	22.5	27.5	32.5	37.5
Frequency	7	12	20	28	8	11

b) In ΔPQR, XY // QR, PX = 1cm, XQ = 3cm, YR = 4.5cm and QR = 9cm. If the area of $\Delta XPY = 4\ cm^2$, find [3]

i) area (ΔPQR).

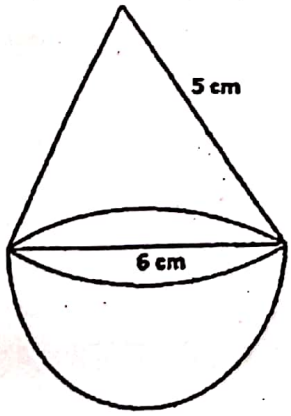
ii) perimeter of figure XYRQ.



c) The given figure represents a cone mounted on a hemisphere with the same radius. The diameter of the base of the conical portion is 6 cm each and its slant height is 5 cm. Calculate: [4]

i) the surface area of the figure

ii) volume of the solid formed .



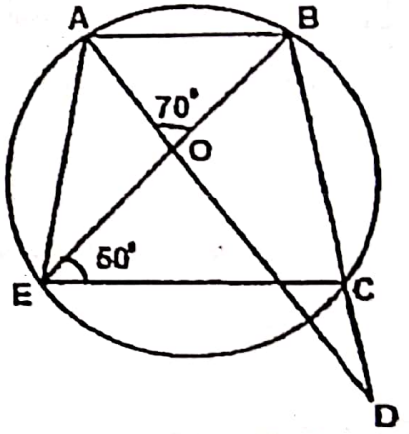
Question 10

a) Diya buys a used scooter for ₹ 12000. She pays ₹ 6000 cash and agrees to pay 12% interest on the unpaid amount along with 12 annual installments of ₹ 500. How much will the scooter cost her? [3]

b) Solve $5x^2-3x-4=0$ .Give your answer correct to 3 decimal figures. [3]

c) In the figure given below, ABCE is a cyclic quadrilateral in which O is the centre of circle. $\angle AOB = 70°, \angle BEC = 50°$. Calculate:

i) $\angle AEB$ ii) $\angle ADB$ iii) $\angle DAE$ [4]



Question 11

a) A (2,3), B(6,-1) and C (,-4,-3) are the vertices of a triangle. Write the equation of the attitude through B. [3]

b) Prove that $\sqrt{\sec^2\theta + \operatorname{cosec}^2\theta} = \tan\theta + \cot\theta$ [3]

c) Plot L (2,4), M (-2,1) and N (5,0). Reflect points L & M in x-axis to get P & Q.

i) Write the co-ordinates of P & Q.

ii) Give a geometrical name to the figure formed by joining the points LMQPN.

iii) Find the area of the figure LMQPN.

iv) Name two invariant points from the figure on reflection in x-axis. [4]

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