CAMPION SCHOOL, MUMBAI
PRELIMINARY EXAMINATION

Std. X | Date : 03/01/2019 | Sub : Mathematics | Time : 2 ½ hours | Marks : 80

Answer 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 answer.

The intended marks for questions or parts of questions, are given in brackets [ ]

SECTION A [40 MARKS]

ALL QUESTIONS IN THIS SECTION ARE COMPULSORY

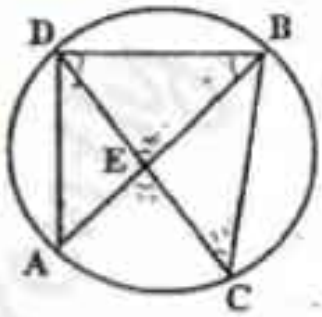
Question 1

a) If a, b, c are in continued proportion, prove that: $\frac{pa^2+qab+rb^2}{pb^2+qbc+rc^2} = \frac{a}{c}$ (3)

b) Solve the following inequation and represent it on the number line, where x ∈ I:

$-2\frac{1}{6} \le \frac{x}{3} - 1\frac{1}{6} < \frac{5}{6}$ (3)

c) AB is a diameter of the given circle. Angle AEC = 40°, angle BCE = 22°. Find Angle ABD and Angle BDE. (4)



Question 2

a) Find the sum of first 20 terms of an AP whose third term is 7 and the seventh term exceeds 3 times the third term by 2. (3)

b) $(x^2 + 2x - 15)$ is a factor of $x^3 + ax^2 + bx - 30$. Find the values of a and b. (3)

c) Solve, give your answer correct to 3 significant figures: $(x-1)^2 - 3x + 4 = 0$ (4)

Question 3

a) A solid metal cylinder of radius 14 cm and height 21 cm is melted down and recast into spheres of radius 3.5 cm. Calculate the number of spheres that can be made. (3)

b) Mr. Marda opens a recurring deposit account in a bank which gives simple interest of 8% p.a. He receives Rs. 20,220 after 3 years. Find the monthly deposit. (3)

c) Line $3x - 4y = 18$ meets x-axis at A and y-axis at B. Find the area of triangle AOB where O is the origin. (4)

Contd..2

Question 4

a) The ages of 48 players in a coaching camp are as follows: (4)

Age (in years)	11 – 13	13 – 15	15 – 17	17 – 19	19 – 21	21 – 23	23 – 25
No. of people	3	6	9	13	8	5	4

Calculate the mean age by short-cut method.

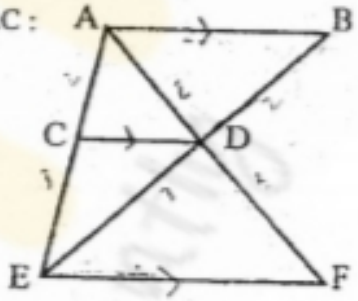
b) Mr. Peeyush invests in Rs. 10,000 in Rs 25 shares standing at Rs 40. After one year he receives a dividend of 8% and immediately sells shares at Rs 42 each. He invests the sale proceeds in a new company with Rs 10 share quoted at Rs 12 giving 9% dividend. (3)

(i) Find the change in income

(ii) The percentage increase in his return on his original investment.

c) In the given figure AB ∥ CD ∥ EF. If CD = 6 cm and AC : CE = 2 : 3, find

(i) A(Triangle ADB) : A(Triangle FDE) (3)



SECTION B

SOLVE ANY 4 OUT OF 7 FROM THIS SECTION

[40 MARKS]

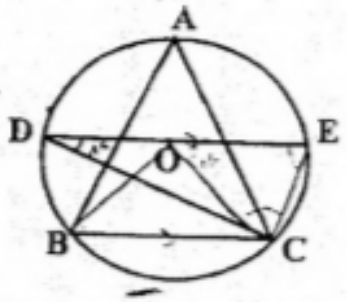
Question 5

a) From top of a building 20 m high, the angle of elevation of the top of the monument is 45^0 and the angle of depression of its foot is 15^0. Find the height of the monument to the nearest meter. (3)

b) Prove the following identity: $\frac{\sin A}{1+\cos A} + \frac{1+\cos A}{\sin A} = 2\ cosec\ A$ (3)

c) In the given figure, BC ∥ DE and O is the centre of the circle.

If angle CDE = 28^0; find the value of Angle BAC. (4)



Question 6

a) Find the equation of a line passing through the point (1, 4) and intersecting the line $x - 2y - 11 = 0$ on the y-axis. (3)

b) The first term and the last term of the AP are 34 and 700 respectively. If the common difference is 18, how many terms are there and what is their sum? (3)

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

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

Question 7

a) Plot A(3, 0) and B(6, 4) on a graph paper. (5)

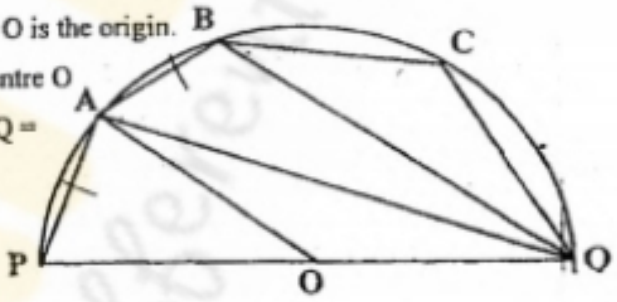
(i) Reflect B to B' in the line $x = 0$ and write the co-ordinates of B'

(ii) Reflect A to A' in the line BB' write the co-ordinates of A'

(iii) Locate point P and write its co-ordinates which is equidistant from A and B and equidistant from B'A' and A'B

(iv) Find the Area of triangle APO where O is the origin.

b) The given figure shows a semi-circle with centre O and diameter PQ. If PA = AB and Angle BCQ = 140^0; then prove that AO ∥ BQ. (5)



Question 8

a) Calculate the ratio in which the line joining the points (– 3, – 1) and (5, 7) is divided by the line $x = 2$. Also, find the co-ordinates of the point of intersection. (3)

b) Using the Remainder Theorem, factorise $x^3 + 13x^2 + 31x - 45$ completely. (3)

c) Construct a triangle ABC, in which BC = 7.5 cm, angle B = 60^0, altitude AD = 3 cm. Construct a circle to touch BC at its midpoint and to pass through A. (4)

Question 9

a) Given $\begin{bmatrix} 8 & -2 \\ 1 & 4 \end{bmatrix} . X = \begin{bmatrix} 12 \\ 10 \end{bmatrix}$. Write down (3)

(i) The order of matrix X

(ii) The matrix X.

Contd..4

b) Using the properties of proportion, solve the expression: $\frac{1+x+x^2}{1-x+x^2} = \frac{62(1+x)}{63(1-x)}$ (3)

c) One year ago, father was 8 times as old as his son. Now his age is the square of his son's age. Find their present ages. (4)

Question 10

a) The given figure shows a cylinder whose radius is 6 cm with a hemispherical portion of same radius on top. Water is filled in the cylinder to a height of 10 cm. How much will the level of water rise, if the cylinder is inverted. (4)

b) 100 pupils in a school have weights as tabulated below. Take a scale of 2 cm = 5 cm of height and 2 cm = 10 pupils. (6)

Weight (in kg)	40 – 45	45 – 50	50 – 55	55 – 60	60 – 65	65 – 70	70 – 75
No. of pupils	12	16	30	20	14	5	3

Draw ogive and estimate the following:

(i) The median weight.

(ii) The number of pupil who are obese, if weight more than 67 kg is considered obese.

(iii) The number of pupil whose weight is less than 47 kg.

Question 11

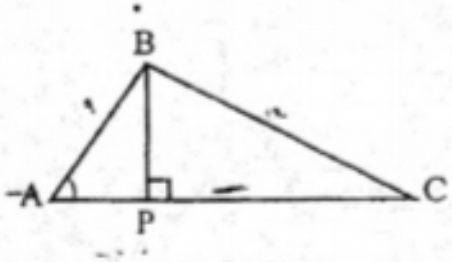
a) If two digit numbers are made with 3, 5, 7 and 9, what is the probability that the number is: (3)

(i) greater than 55

(ii) a prime number.

b) Find the number of terms of a GP whose first term is $\frac{3}{4}$ and common ratio is 2 and the last term is 384. (3)

c) In the given figure, AB = 9 cm, BC = 12 cm and AC = 15 cm. BP ⊥ AC. Find BP and AP. (4)



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