MANECKJI COOPER EDUCATION TRUST SCHOOL, JUHU TARA ROAD, JUHU, MUMBAI-400059
PRELIMINARY EXAMINATION –JANUARY 2019
Std: X Date: 14 -01-2019

Time: $2\frac{1}{2}$ Hours Subject: MATHEMATICS No. of Printed sides: 3

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.

Section I is compulsory. Attempt any four questions from this Section II.
The intended marks for questions or parts of questions are given in brackets *[ ]*.

Section I (40 Marks)
Attempt all questions from this Section.

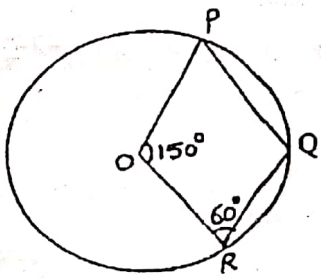
Question 1.

(a) The 4th and 15th term of A.P. are 22 and 66 respectively. Find the first term and the sum of first 11 terms. [3]

(b) Using Remainder theorem, Show that (2x +1) is a factor of polynomial $p(x) = 4x^3 + 4x^2 - x - 1$, hence Factorise the polynomial. [3]

(c) In the given figure, O is the centre of the circle. If ∠POR = 150° and ∠ORQ = 60°, find the measure of:

(i) ∠PQR
(ii) ∠ OPR
(iii) ∠QRP
(iv) ∠RPQ



[4]

Question 2.

(a) Solve for x and give your answer correct to two significant figures: [3]

$$x^2 - 3x - 9 = 0$$

(b) Prove the given identity: $\frac{sin^3A - cos^3A}{1 + \sin A cos A} = \sin A - \cos A$ [3]

(c) Some cards are numbered from 10 to 40 and well shuffled. One card is drawn at random. What is the Probability that is:

(i) a prime number
(ii) divisible by 2 and 5
(iii) a perfect square. [4]

Question 3.

(a) P, Q and R have co- ordinates (-2,1) , (2, 2) and (6, -2) respectively, write down:

(i) the gradient of QR
(ii) equation of QR
(iii) the equation of the line through P perpendicular to QR. [3]

(b) Solve the following inequation, write the solution set and represent the solution set on the number line.

$$\frac{1}{5} \leq \frac{3x}{10} + 1 < 1\frac{3}{5}, x \in R$$ [3]

(c) Construct a regular hexagon of side 4.3 cm and construct a circle circumscribing the hexagon. [4]

Question 4.

(a) Mr. Chakraborty bought ₹100 sharesof dividend 9% selling at certain price. If the rate of return is 7.5% . Calculate: (i) the market value of each share.
(ii) the amount to be invested to obtain an annual income of ₹1260.
(iii) how many more shares should he buy to increase his income to ₹1890. [3]

4(b) A spherical cannon ball of diameter 28 cm is melted and cast into a right circular cone with base diameter 35 cm. Find the height of cone, correct to one decimal place. [3]

(c) Draw a Histogram to determine the mode of the following frequency distribution. State the Modal class also [4]

Class interval	80 - 90	90 -100	100 - 110	110 - 120	120 - 130	130- 140
frequency	8	10	12	14	7	4

Section II [40 marks]

Attempt ANY FOUR questions from this section.

Question 5.

(a) Given: $\begin{bmatrix} 3 & -2 \\ -4 & 4 \end{bmatrix}\begin{bmatrix} 2x \\ 1 \end{bmatrix} + 2\begin{bmatrix} -4 \\ 5 \end{bmatrix} = \begin{bmatrix} 8 \\ 4y \end{bmatrix}$, find the value of x and y. [3]

(b) How many terms of the G.P series: $1 + 3 + 3^2 + \ldots\ldots$ must be taken to make the sum 3280? [3]

(c) If $\frac{x^2+x+1}{y^2+y+1} = \frac{x^2-x+1}{y^2-y+1}$, then show that xy = 1. [4]

Question 6.

(a) Rohit deposited ₹400 at the beginning of every month in a recurring deposit account and received ₹16,398 at the end of 3 years. Find the rate of interest given by the bank. [3]

(b) A map of a square plot of land is drawn to scale of 1: 2500. If the area of the plot on the map is 72cm². Find

(i) The actual area of the land in square Km.

(ii) The length of the diagonal in actual plot of land in meters. [3]

(c) Use graph paper for this question. Take 2cm as 2 units on both the axes.

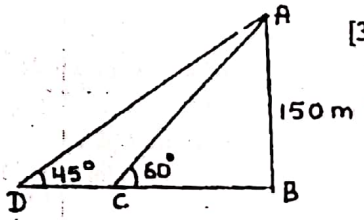
Plot the points A(1, 2) , B(8,3) , C(7,8) and D (3, 7). Complete the quadrilateral ABCD. Find the point P inside the quadrilateral such that AP = BP and P is also equidistantfrom AB and AD. Record the length PB. [4]

Question 7.

(a) The mean of the following distribution is 24. Find the missing frequency 'a': [3]

Class interval	0 — 10	10 — 20	20. — 30	30 — 40	40 — 50
Frequency	10	6	a	12	5

(b) A man in a boat rowing away from a lighthouse 150 m high, takes 1 minute to change the angle ofelevation of the top of the lighthouse from 60° to 45° . Find the speed of the boat. [3]



(c) Prove that if two chords of a circle intersect internally or externally, the product of the lengths of theirsegments formed are equal. [4]

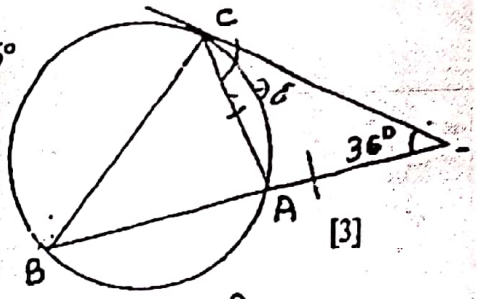
Question 8.

(a) The line segment joining A $(-1, \frac{5}{3})$ and B (a, 5) is divided in the ratio 1:3 at P, the point where the line segment intersects Y- axis. Calculate:

(i) the value of 'a'

(ii) coordinates of P. [3]

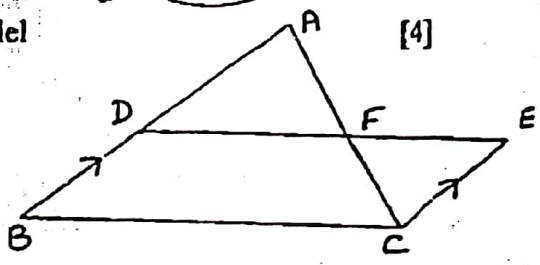
&(b) In the figure tangent CT and chord BA extended meet at T. If ∠CTA = 36° and AT = AC, find ∠ABC. If length of tangent CT = 12cm and AT = 8cm, find the length of chord AB.



[3]

(c) In the given figure, ABC and CEF are two triangles where BA is parallel to CE and AF: AC = 5: 8.

(i) Prove that Δ ADFis similar to ΔCEF.
(ii) Find AD if CE = 6cm.
(iii) If DE is parallel to BC, find are (Δ ADF): area (Δ ABC)



[4]

Question 9.

(a) The total surface area of a hollow metal cylinder, open at both ends, of external radius 8 cm and height 10 cm is 338π cm^2 . Taking r to be the internal radius, write down an equation in r and use it to state The thickness of the metal in the cylinder. [4]

(b) The following table shows the marks of 120 students, obtained in Mathematics, in ICSE examination. Draw an ogive for the table:

Marks	30 - 40	40 - 50	50 - 60	60 - 70	70 – 80	80 - 90	90 - 100
No. of students	1	3	11	21	43	32	9

Use the ogive to estimate:

(i) the median (ii) the upper quartile
(iii) the number of students who got more than 95% marks.
(iv) the marks obtained by top 20% students in the examination. [6]

Question 10.

(a) For what value of 'p' the following equation has equal roots:

$$x^2 - 2px + (7p - 12) = 0$$ [3]

(b) Prove that: $\dfrac{(\cot A - cosec\, A)^2 + 1}{sec A\,(cosec\, A - \cot A)} = 2\cot A$ [3]

(c) Use graph paper for this question. Take 1 cm = 1 unit on both the axes.

(i) Plot the points A (–3, 3) and B(2,2)
(ii) Write the coordinates of A' and B', the images of A and B respectively on reflection in origin.
(iii) Write the geometrical name of the figure ABA'B'.
(iv) Write the coordinates of two invariant points in y-axis in the figure. [4]

Question 11.

(a) Find the sum of the terms of the A.P. : 4, 9, 14,....., 89. Also find the 4th term from end. [3]

(b) Given $A = \begin{bmatrix} 2 & -6 \\ 2 & 0 \end{bmatrix}$, $B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 4 & 0 \\ 0 & 2 \end{bmatrix}$. Find the matrix X, such that

$A + 2X = 2B + C$ [3]

(c) Mr. Ravi has a recurring deposit account of ₹ 400 per month at 10% per annum. If he gets ₹16220 At the time of maturity, find total time for which the account was held. [4]