Narsee Monjee Educational Trust's
JAMNABAI NARSEE SCHOOL
Narsee Monjee Bhavan, Narsee Monjee Marg,
N.S.Road No. 7, J.V.P.D. Scheme,
Vile Parle (W), Mumbai - 400 049, India.
contactus@jns.ac.in
+91 22 2618 7575 / 2618 7676
www.jns.ac.in

SECOND PRELIMINARY EXAMINATION – JANUARY 2019
MATHEMATICS

Class:10
Marks: 80
Time: $2\frac{1}{2}$ hrs
Date:14.1.2019

This paper consists of 5 printed pages.

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 answers.

Attempt all the questions from Section I and four questions from Section II.
The intended marks for questions or parts of questions, are given in brackets [ ]

SECTION A (40Marks)
Attempt all questions from this section.

Question 1

a) Find the sum of the first 40 terms of an A.P whose 4^{th} term is 8 and the 6^{th} term is 14. [3]

b) If $M \times \begin{bmatrix} 1 & 4 \\ 2 & 1 \end{bmatrix} = \begin{bmatrix} 17 & 5 \end{bmatrix}$, find i. the order of Matrix M [3]

ii. the Matrix M

c) From the following frequency distribution table, find the mean, mode and median. [4]

Variate	10	11	13	15	18	20	24
Frequency	4	3	7	1	5	2	3

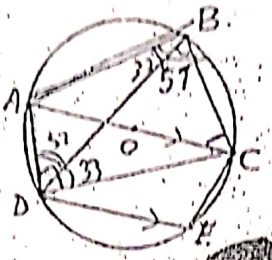
Question 2

(a) Solve the following in-equation and graph the solution set on the number line.

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

b) In the figure, DB is a chord parallel to the diameter AC of a circle with centre O.

If $\angle CBD = 57^\circ$, calculate $\angle CDE$. [3]



c) If $x = \dfrac{\sqrt{a+3b} + \sqrt{a-3b}}{\sqrt{a+3b} - \sqrt{a-3b}}$, prove that $3bx^2 - 2ax + 3b = 0$ [4]

Question 3

a) Mr. Kohli owns 560 shares of a company. The face value of each share is Rs.25. The company declares a dividend of 9%. Calculate

i. the dividend that Mr.Kohli will get.

ii. the rate of interest on his investment, if he paid Rs.30 for each share. [3]

b) Using factor theorem show that (x-1) is a factor of $x^3 + 3x^2 - 4x - 8$. Hence, factorise the given expression completely. [3]

c) In triangle ABC, P (-2, 5) is the mid-point of AB, Q (2, 4) is the mid-point of BC and R (-1, 2) is the mid-point of AC. Calculate the co-ordinates of vertices A, B and C. [4]

Question 4

a) Ami opened a recurring deposit account in a bank and deposited Rs 300 per month for two years. If she received Rs 7,725 at the time of maturity, find the rate of interest per annum. [3]

b) Solve the following equation for x and give your answer correct to two decimal places. [3]

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

c) Use a graph paper for this question. Take 1cm = 1 unit along both x-axis and y-axis. [4]

i. Plot the points A(0, 3), B(2, 3), C(3, 0), D(2, -3), E(0, -3)

ii. Reflect points B, C and D on the y-axis to get B', C' and D' respectively. Write the co-ordinates of B', C' and D'.

iii. Write the equation of line B'D'.

iv. Name the figure BCDD'C'B'B

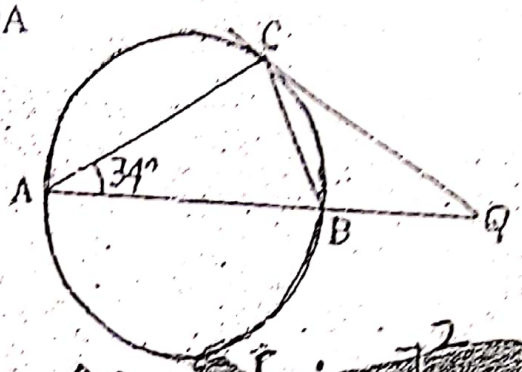
28

SECTION B (40 Marks)

Attempt any four questions from this Section.

Question 5

a) In the given figure, AB is a diameter. The tangent at C meets AB at Q. If $\angle CAB = 34°$ find i. $\angle CBA$ ii. $\angle CQA$ [3]



b) Prove the following identity : $\frac{\sec\theta - 1}{\sec\theta + 1} = \left[\frac{\sin\theta}{1+\cos\theta}\right]^2$ [3]

c) The following table gives the wages of workers in a factory. Calculate the mean by Step-Deviation method. [4]

Wages(Rs.)	45-50	50-55	55-60	60-65	65-70	70-75	75-80
Workers			30	25	14	12	6

Question 6

a) Draw a circle of radius 3.5cm. Mark a point 'T' outside the circle at a distance of 6cm from the centre. Construct two tangents from 'T' to the given circle. Measure and write down the length of one tangent. [3]

b) Find the equation of a line with x-intercept −5 and passing through the point (4,-7). [3]

c) Some students planned a picnic. The budget for the food was Rs.480 . As eight of them failed to join the party, the cost of the food for each member increased by Rs 10. Find how many students went for the picnic. [4]

Question 7

a) Sixteen cards are labelled as a, b , c, ...m , n, o , p. They are put in a box and shuffled. A boy is asked to draw a card from the box. What is the probability that the card drawn is:
i. a vowel.
ii. a consonant.
iii. none of the letters of the word median. [3]

b) If the lines $y = 3x + 7$ and $2y + px = 3$ are perpendicular to each other, find the value of p. [3]

(c) How many terms of the G.P $\frac{2}{9}, -\frac{1}{3}, \frac{1}{2}, \ldots\ldots\ldots$ must be added to get the sum equal to $\frac{55}{72}$?

[4]

Question 8

a) Salman gets Rs.6455 at the end of one year at a rate of 14% per annum in a recurring deposit account. Find the monthly instalment.

[3]

b) Find the value of m for which the given equation has real and equal roots.

$$x^2 + 2(m-1)x + (m+5) = 0$$

[3]

c) The volume of a conical tent is $1232m^3$ and the area of the bare floor is $154\ m^2$. Calculate

i) radius of the floor.
ii) height of the cone Tent
iii) length of the canvas required to cover this conical tent if its width is 2m. [4]

Question 9

a) The inner diameter of a circular well is 7m. It is 12 m deep. Find the cost of plastering the curved surface at the rate of Rs 100 per m^2.

[4]

b) The marks obtained by 200 students in an examination are given below as follows : [6]

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
students	5	10	11	20	27	38	40	29	14	6

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

1. median
2. lower quartile
3. number of students who obtained more than 80% marks.
4. number of students who did not pass if pass percentage was 35.

Use the scale 2cm = 10 marks on one axis and 2cm = 20 students on the other axis.

Question 10

a) Find x and y if $\begin{bmatrix} 3 & -2 \\ -1 & 4 \end{bmatrix} \begin{bmatrix} 2x \\ 1 \end{bmatrix} + 2 \begin{bmatrix} -4 \\ 5 \end{bmatrix} = 4 \begin{bmatrix} 2 \\ y \end{bmatrix}$ [3]

b) Draw a histogram and hence estimate the mode for the following frequency distribution. [3]

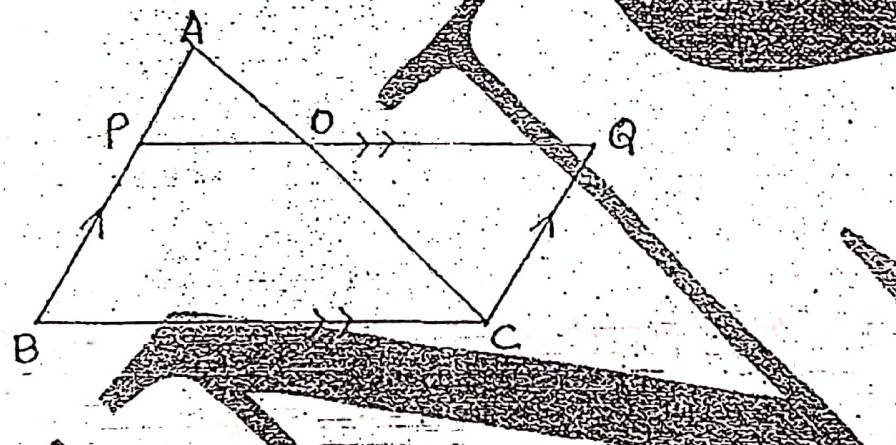
Class	0-10	10-20	20-30	30-40	40-50	50-60
frequency	2	8	10	5	4	3

c) Two people standing on the same side of a tower in a straight line with it, measure the angles of elevation of the top of the tower as 25° and 50°. If the height of the tower is 70m, find the distance between the two people. [4]

Question 11

(a) In Δ ABC, AP:PB = 2 : 3. PO is parallel to BC and is extended to Q so that CQ is parallel to BA. Find, [3]

1. A (Δ APO) : A(Δ ABC)
2. A (Δ APO) : A(Δ CQO)



b) If $\frac{8a-5b}{8c-5d} = \frac{8a+5b}{8c+5d}$ prove that $\frac{a}{b} = \frac{c}{d}$ [3]

(c) The line joining P (−1, 5) and Q (3, 2) intersects the y-axis at R. PM and QN are perpendiculars from P and Q on the x-axis. Find

i. the ratio PR : RQ
ii. co-ordinates of R
iii. the area of quadrilateral PMNQ. [4]