MAR THOMA RESIDENTIAL SCHOOL,TIRUVALLA
FIRST MODEL EXAMINATION 2017-18
MATHEMATICS

CLASS X

TIME;$2\frac{1}{2}$hrs

Max mark80

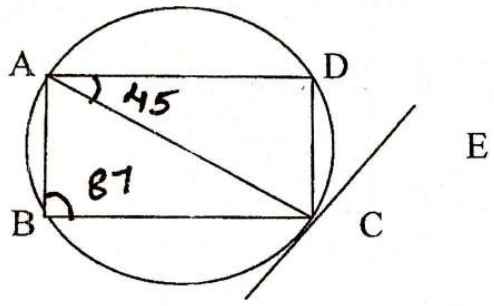
Attempt all questions from Section A and any four questions from Section B.

The intended marks for questions or parts of questions are given in brackets .

SECTION A (40 Marks)

QUESTION-1

1. Using remainder theorem , find the remainder when $4x^3-12x^2+14x-3$ is divided by 2x-1 (3)
2. Mr. Das deposited Rs800 per month in a recurring deposit account for 6 years. Find the amount payable to him on maturity ,if the rate of interest is 6% p. a (3)
3. In the given figure CE is a tangent to the circle at point C. ABCD is a cyclic quadrilateral. If $< ABC = 87° \; and \; < DAC = 45°$ find $i) < ADC \; ii) < DCE \;\; iii) < ACD$



(4)

QUESTION-2

1. Solve the following inequation and represent your solution on the real number line
   $-3+x \leq \frac{8x}{3}+2 \leq \frac{14}{3}+2x$, $x \in I$ (3)
2. Find the 23^{rd} term of the AP 5,13,21,.....Find the sum of the first six terms? (3)
3. The price of an article is Rs 9350 which includes VAT at 10%. Find how much less a customer pays for the article, if the VAT on the article decreases by 3% . (4)

QUESTION-3

1. Prove the following identity (cosecA +cotA-1)(cosecA-cotA+1) = 2cotA (3)
2. If A= $\begin{bmatrix}1 & 2\\ 2 & 1\end{bmatrix}$ and I is a unit matrix of the same order and $A^2 = 2A + mI$, then find the value of m. (3)
3. A solid cylinder of radius 14 cm and height 21 cm is melted down and recast into solid spheres each of radius 3.5 cm. Find the number of spheres formed $[\pi = \frac{22}{7}]$ (4)

QUESTION-4

1. A bag contains 4 red balls , 6 green balls and some white balls. If the probability of not drawing a white ball in one draw is $\frac{2}{3}$, then find the number of white balls. (3)
2. Calculate the mean ,median and mode for the following distribution:

Weight (in kg)	42	47	52	57	62	67	72
No. of students	3	8	6	8	11	5	9

(3)

3. For what value of 'k' will the following quadratic equation $x^2 + 7(3 + 2k) - 2x(1 + 3k) = 0$ has real and equal roots? Solve the equations (4)

SECTION B (40 Marks)

QUESTION-5

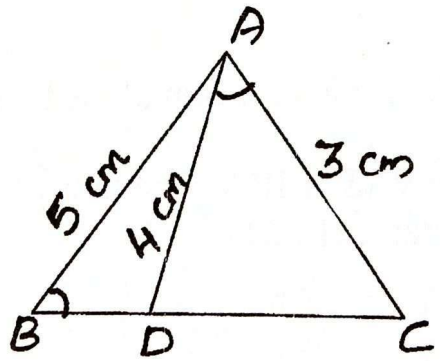
1. The 4^{th} and 9^{th} terms of an arithmetic progression are -15and -30 respectively. Find the first term and the common difference and hence find the sum of the first 15 terms. (3)
2. Let $P \times \begin{bmatrix} 1 & 2 \\ -3 & 4 \end{bmatrix} = [1 \quad 12]$. Find i) order of the matrix P ii) matrix P (3)
3. The mean of the following distribution is 50. Find the missing frequency 'a'

Class	0-20	20-40	40-60	60-80	80-100
Frequency	17	28	32	a	19

(4)

QUESTION-6

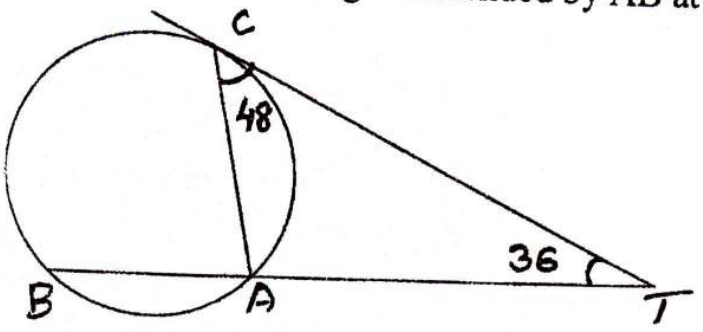
1. In the alongside figure D is a point on BC such that $< ABD = < CAD$. If AB = 5cm , AC= 3cm and AD = 4cm, find i) BC ii) DC iii) area of ΔACD: area of ΔBCA (3)



2. Find the ratio in which the line joining $(-3, -1)$ and $(5,7)$ is divided by the line x = 2. Hence find the point of intersection. (3)
3. A circus tent is in the form of a right circular cylinder and a right circular cone above it . The diameter and height of the cylindrical tent are 126m and 5m respectively. The total height of the circus tent is 21cm. Find the total surface area of the tent. (4)

QUESTION-7

1. A,B and C are three points on a circle . The tangent at C meets BA produced at T. $< ATC = 36°$ and $< ACT = 48°$, calculate the angle subtended by AB at the centre of the circl



(3)

2. The sum of the first three terms of a G.P.is $\frac{13}{12}$ and their product is -1. Find the common ratio and the terms .

(3)

3. X(0,4),Y(3,0) are the vertices of a ΔXOY where O is the origin.
   i) Write down the coordinates of X_1,the reflection of X in the x-axis and Y_1, the reflection of Y in the y-axis
   ii) Assign a special name to the figure XYX_1Y_1.
   iii) If Z is the midpoint of XY, write down the coordinates of Z_1, the reflection of Z in the origin.
   iv) Assign a special name to the quadrilateral XYX_1Z_1

(4)

QUESTION-8

1. The coordinates of the vertex A of a square ABCD are (1,2) and the equation of the diagonal BD is $x + 2y = 10$. Find the
   i) equation of the diagonal AC.
   ii) coordinates of the centre of the square.
   iii) coordinates of the intercepts made by the diagonal AC on the coordinate axes.

(3)

2. Prove the following identity

$$\frac{\cos A}{\operatorname{cosec} A+1} + \frac{\cos A}{\operatorname{cosec} A-1} = 2\tan A.$$

(3)

3. Using properties of proportion, find x : y if $\frac{a^3+3ab^2}{b^3+3a^2b} = \frac{172}{171}$

(4)

QUESTION-9

1. A person buys some copies of a book for Rs 270. If the price of each book is reduced by Rs1.50, he can buy two more books for the same amount. Find the price of each book. (4)
2. Marks obtained by 200 students in an examination are given below

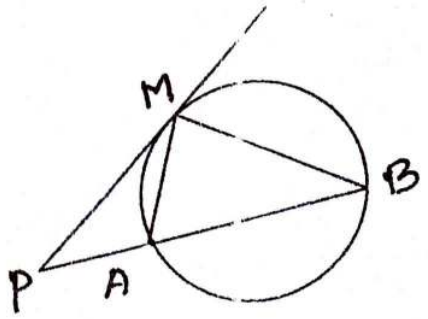
Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of students	5	10	14	21	25	34	36	27	16	12

With the help of a graph paper , plot an ogive for the above distribution and use it to find the
i) median ii) the upper quartile
iii) the number of students scoring above 65 marks

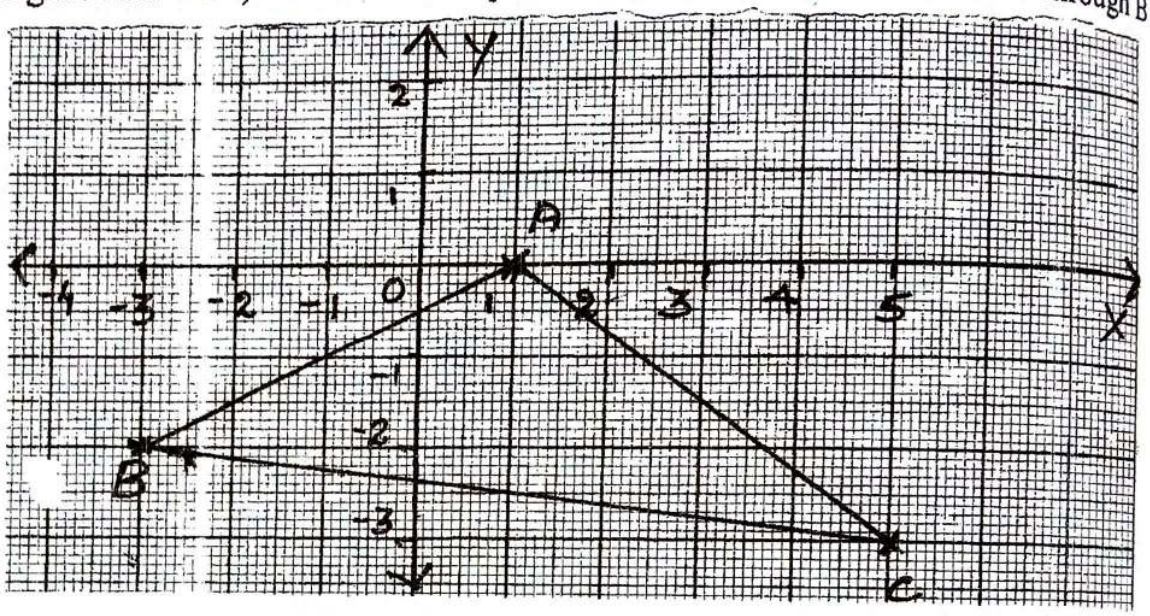
iv) the minimum marks required to qualify if 10 students qualify for merit scholarship

QUESTION-10

1. In the figure , PM is a tangent to the circle and PA= AM. Prove that i) Δ PMB is isosceles (6)
   ii) $PA \cdot PB = MB^2$



2. From the given figure find the i) coordinates of point A,B,C ii) Equation of the line through B and parallel to AC (3)



(3)

3. The marked price of an article is Rs 7500. A manufacturer sells the article to a wholesaler at a discount of 20% on the marked price. The wholesaler sells it to a retailer at a discount of 12% on the marked price . The retailer sells the article at the marked price. If the VAT paid by the wholesaler is Rs 72, find the i) rate of VAT ii) VAT paid by the retailer. (4)

QUESTION-11

1. Mr. Ram sold a certain number of shares of Rs20 each, paying 8%at Rs 18 and invested the proceeds in Rs 10 shares, paying 12% at Rs 5 premium. If the change in his annual income is Rs 80 ,find the number of shares sold by Ram. (3)
2. The angle of elevation of the top of a building from the foot of the tower is 30^0 and the angle of elevation of the top of a tower from the foot of the building is 60^0. If the tower is 50m high ,find the height of the building. (3)
3. Construct a triangle ABC in which base BC=6.5cm, AB= 6cm and $\angle ABC = 120^0$
   i)Construct a circle circumscribing the ΔABC
   ii)Draw a cyclic quadrilateral ABCD so that D is equidistant from AB and BC. (4)