Class	Sub.	Exam	----			.....
10	Mathematics	Prelim	16.01.2019	80	2½ hrs.	3

General Instructions:

1. *Attempt all questions from section-A.*
2. *Attempt any 4 complete questions from section B*
3. *All working, including rough work, must be clearly shown and must be done on the same sheet as the rest of the answer.*
4. *Omission of essential working will result in loss of marks.*
5. *Mathematical tables are provided.*

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SECTION A (40 Marks)

Attempt all questions from this section.

Question 1

A) Solve the following equation and give the answer correct to two decimal places: [3]

$$x(x-3)+1=0$$

B) Find the 6th term from the end of the A.P 19, 14, 9, ----- [– 46] [3]

C) The following data shows the height of certain number of students in a class: [4]

Height (in cms)	168	159	160	155	162	167	165
No. of students	7	6	7	2	20	14	14

Find the median, inter-quartile range and mode of the above data.

Question 2

A) Mr. Sunil opened a cumulative deposit account in a bank paying 12% interest p.a. [3]
At the end of two years, he received Rs. 6750. Calculate the monthly deposit.

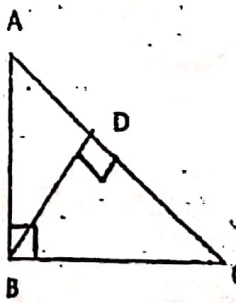
B) If $A=\begin{bmatrix}5 & -4\\ -2 & 6\end{bmatrix}$, $B=\begin{bmatrix}-4\\ 5\end{bmatrix}$ and $C^T=[3 \quad 1]$, find $AC-3B$. [3]

C) The curved surface area of a solid sphere is 2826 cm^2. It is melted and recast in to solid cones of radius 1.5 cm and height 5 cm, find the following: [4]
I) The radius of the sphere (take $\pi = 3.14$)
II) The number of cones formed.

Question 3

A) Factorise $6x^3+11x^2-3x-2$ completely. [3]

B) In Δ ABC, ∠ABC = 90° and BD ⊥AC. Prove Δ ABD ~ Δ BCD.
If AB = 5.7 cm BD = 3.8cm and CD = 5.4 cm find BC. [3]



C) Given points A (7, -3) and B (1, 9). Find the following: [4]
I) The slope of AB.
II) Equation of CD, the perpendicular bisector of AB.
III) The value of p, if (-2, p) lies on CD.

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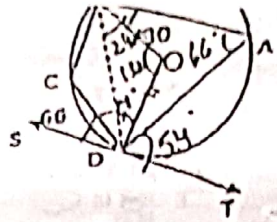
B) In the adjoining figure O is the center of the circle, ST is a tangent to the circle at D. ∠ABO = 30° and ∠BDS = 66°. Find ∠BAD, ∠DCD and ∠ADT. [3]



C) Prove the following trigonometric identity: [4]

$(\cos\theta - cosec\theta)^2 + (sin\theta - sec\theta)^2 = (1 - sec\theta cosec\theta)^2$

SECTION – B

(Attempt any four complete questions from this section)

Question 5

A) How many terms of the A.P 33, 37, 41, - - - - must be taken to get a sum of 1206. [3]

B) If $A = \begin{bmatrix} 2 & -3 \\ a & b \end{bmatrix}$ find a and b so that $A^2 = I$ [3]

C) Using properties of proportion solve for x if $\frac{x^4+9}{6x^2} = \frac{25}{24}$ [4]

Question 6

A) A) The perimeter of a rectangular field is 104 m and its area is 640 m^2. Assume the length of the rectangle as x m, write breadth in terms of x, frame a quadratic equation in x and find the dimensions of the field. [4]

B) The table below shows the marks obtained a group of 200 students in an examination.

Marks less than	10	20	30	40	50	60	70	80
No. of students	5	10	30	60	105	142	168	200

Draw an ogive on a graph sheet. Use a scale of 2 cm = 10 marks on x –axis and 2 cm = 20 students on Y – axis and estimate the following values: [6]

i) Median marks
ii) Lower quartile
iii) Find the number of students getting more than 72 marks
iv) Find the number of students scoring less than 40%.

Question 7

A) Prove the following trigonometric identity: $cotA - tanA = \frac{2cos^2A-1}{sinA\ cosA}$ [3]

B) A line meets X – axis at the point A and Y – axis at the point B. A point P (– 3, 4) divides AB in the ratio 2 : 3. Find the coordinates of A and B. [3]

C) Use graph paper for this question. Plot A (5, 4) and B (3, 2). Reflect points A and B in x – axis to get A' and B' respectively.
i) write the coordinate of A' and B'.
ii) C is the image of B and C' is the image of B' when they are reflected in the line AA'
iii) Give the geometrical name of the figure BACC'A'B' and find its area. [4]

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A) A company declares a dividend of 8% on Rs.100 shares. Atul buys 720 shares and gets 10% income on his investment. Find the money invested by Atul and his annual income. [3]

B) Cards bearing odd numbers 01, 03, 05, 07, -, -, -, 21, 23, 25 are kept in a bag. A card is drawn at random from the bag. Find the probability of getting a card which is

i) A number divisible by 3 or 5
ii) A perfect square number
iii) The sum of their digits is more than 5. [3]

C) ΔABC is a right angled triangle in which $\angle A = 90°$, AC = 12 cm, BC = 13 cm. A circle with centre O has been inscribed inside the triangle. Calculate the radius of the inscribed circle. [4]

Question 9

A) Without solving the quadratic equation $x^2 + 2(m-1)x + (m+5) = 0$, find the value of m for which the given equation has real and equal roots. [3]

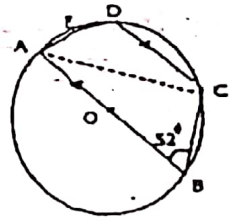
B) A cylindrical roller of length 1.2 m has a radius 35 cm. If it takes 500 revolutions to level a play ground, determine the total cost of leveling it at the rate of Rs.25 per m^2. [3]

C) i) Construct a ΔABC with BC = 6 cm, AB = 5.5 cm and $\angle ABC = 120°$.
ii) Construct a circle circumscribing ΔABC.
iii) Locate a point P on the circumference of the circle which is equidistant from AB and BC.
iv) Find the Measure of the line segment PC [4]

Question 10

A) Find the value of m for which the following points A (m, −1), B (3, −8) and C (5, 6) are collinear. Also find the equation of the line. [3]

B) In the adjoining circle with center O, AB ∥ CD and $\angle ABC = 52°$. Find $\angle BAC$, $\angle ACD$ and $\angle AED$. [3]

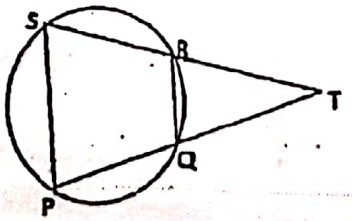


C) A man 1.8 m tall stands on a level ground at a point A and observes the top C of a vertical pole BC at an angle of elevation $x°$ such that $\tan x = \frac{2}{5}$. If the height of the pole is 10 m, calculate the distance AB in meters. [4]

Question 11

A) The sum of the three terms of a G.P is $\frac{61}{20}$ and their product is 1. [3]
Find the first term and the common ratio.

B) i) In the adjoining figure, prove $\Delta TPS \sim \Delta TRQ$.
ii) Find SP if TP = 18 cm, QR = 4 cm and TR = 6cm.
iii) Find the area of quadrilateral PQRS if the area of $\Delta TPS = 27\ cm^2$. [3]



C) Calculate the mean of the following distribution by step – deviation method [4]

Class Interval	11-20	21-30	31-40	41-50	51-60	61-70	71-80
Variate	14	17	29	32	29	16	23

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