ST. GREGORIOS HIGH SCHOOL,

PRELIMINARY EXAMINATION,

STD: 10TH SUB: MATHEMATICS

2nd January, 2019.

TIME: $2\frac{1}{2}$ hr **MAX. MARKS:80.**

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 paper.

SECTION-A

Attempt all the questions from this section.

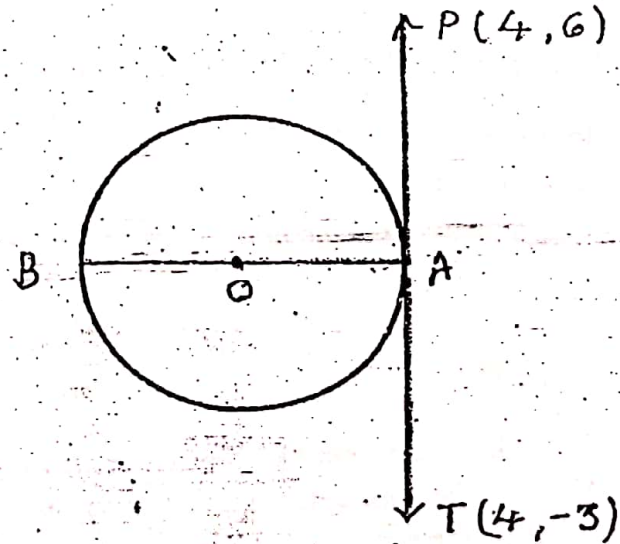
Q.1.A. Solve the given inequation and represent the solution set on the number line. (3)

$$-3 < -\frac{1}{2} - \frac{2x}{3} \leq \frac{5}{6} \quad , \quad where\ x \in N$$

B. AB is the diameter of a circle with centre 'O'. The given point A lies on the X-axis and the point B lies on the origin. PT is the tangent to this given circle at point A. The co-ordinates of the tangent are—point P (4 ,6) and point T (4 , -3). Point A divides this tangent in a certain ratio. (3)

i) Calculate the ratio in which point A divides the tangent PT.

ii) Find the coordinates of point A and point O.



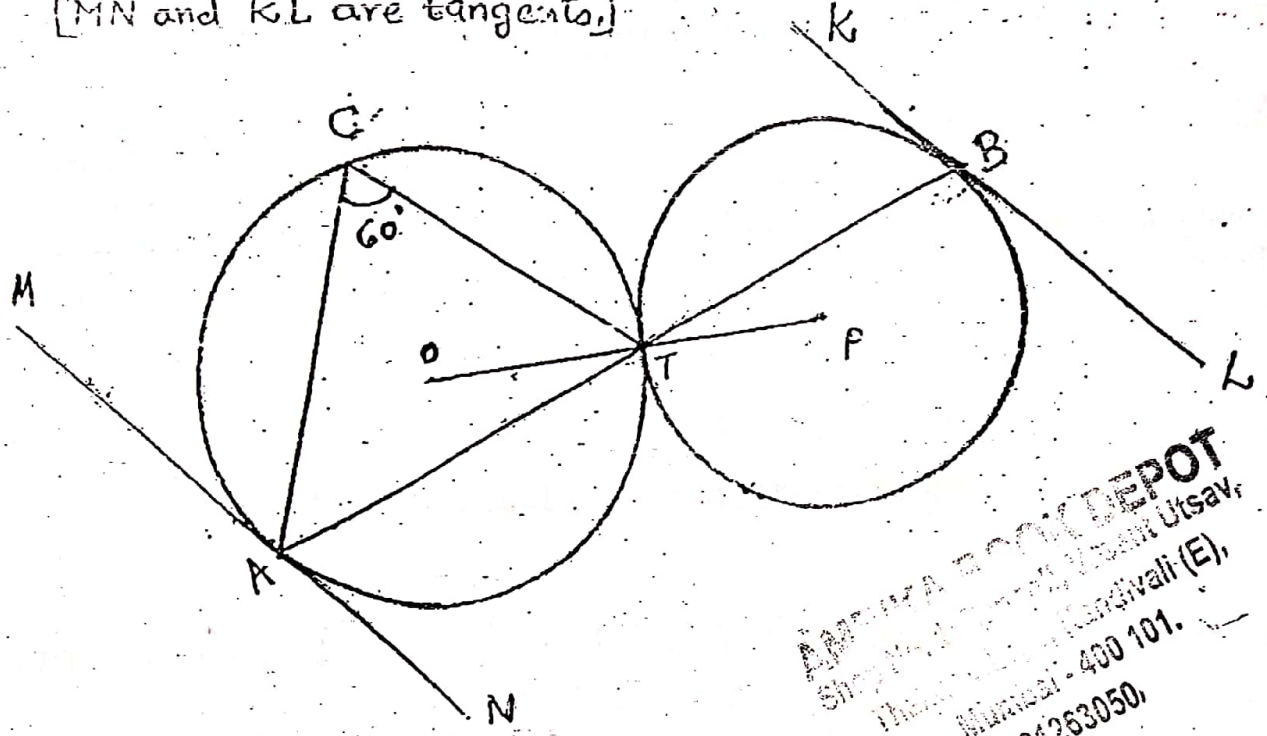
C. If $X + Y = \begin{bmatrix} -5 & 11 \\ 10 & -4 \end{bmatrix}$ and $X - Y = \begin{bmatrix} 9 & -5 \\ -2 & 14 \end{bmatrix}$, find the matrix X and matrix Y. (4)

(18)

II. A. The 4th term of an A.P. is equal to 3 times the first term and the 7th term exceeds the third term by 1. Find the common difference and the fourth term of the given A.P. (3)

B. In the given figure two circles touch each other externally at point T. Point 'O' and point 'P' are the centres of the given circles. Line OTP and Line ATB are the straight lines. Angle ACT is equal to 60°. Calculate the measure of the angle TBK. (3)

[MN and KL are tangents.]



C. Use graph paper to solve this question: (4)

- Plot point A (3 , 3).
- Reflect point A in the X-axis and mark the image as A^1 . Write the co-ordinates of A^1.
- Join the line AA^1.
- Mark the origin as B. Reflect point B in AA^1 . Mark it's image as B^1.
- Write the coordinates of B^1.
- Join ABA^1B^1A and name the figure.

Q.III.A. A man invests rupees 30,000/- in 15 % rupees 110/- shares at rupees 120/-. When these shares rose to rupees 130/-, he sells enough shares to purchase a scooter for his daughter for rupees 3900/-. Calculate:- (3)

i) The number of the shares he still holds.

ii) The loss in his annual income.

B. In the given G.P. the first term is 729 and the seventh term is 64. Calculate the sum of first seven terms. (3)

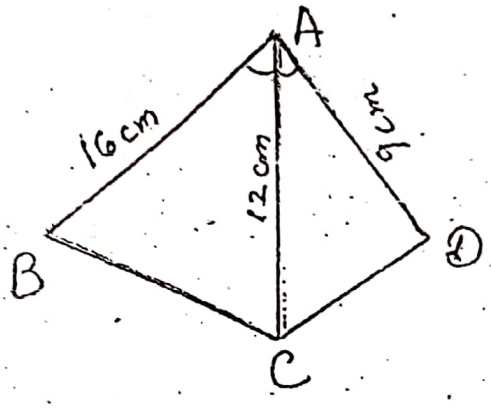
C. A buoy is made in the form of a hemisphere surmounted by a right circular cone. The circular base of the cone coincides with the plane surface of the hemisphere. Calculate i) The height of the cone. and ii) The surface area of the buoy correct to two decimal places. [Take $\pi = \frac{22}{7}$] (4)

radius of base of

Q.IV.A. In the given figure AC bisects angle BAD . side AB = 16 cm ,side AC = 12cm and side AD = 9cm. (3)

i) Prove that Δ ABC $\sim$ Δ ACD

ii) Find A(Δ ABC) : A(Δ ACD)



B. Using formula, solve the given equation and give your answer correct to 3 significant figures. (3)

$$x - \frac{18}{x} = 6$$

C. Use compass and ruler to solve this question. (4)

Construct angle ABC = 60^0 ,where BA = BC = 8cm. The points 'M' and 'N' are the mid-points of sides BA and BC respectively. Draw the locus of a point which is:

i) Equidistant from BA and BC.

ii) 4cm from point M.

iii) 4cm from point N.

Mark the point 'P' which is 4cm from both the points M and N and equidistant from the side BA and side BC. Join MP and NP and name the figure BMPN.

SECTION-B

Attempt Any 4 questions from this section.

Q.V.A. The product of the third term and the eighth term of a G.P. is 243. If the fourth term is 3. Calculate : (3)

i) It's first term. ii) The common difference iii) The fifth term.

B. Prove: (3)

$$(cosA - cosecA)^2 + (sinA - secA)^2 = (1 - secA.cosecA)^2$$

C. A (1, –5) , B (2 ,2) and C (–2 , 4) are the vertices of the triangle ABC. Find the equation of: (4)

i) The median of the triangle through A.

ii) The line passing through it's centroid and parallel to side BC.

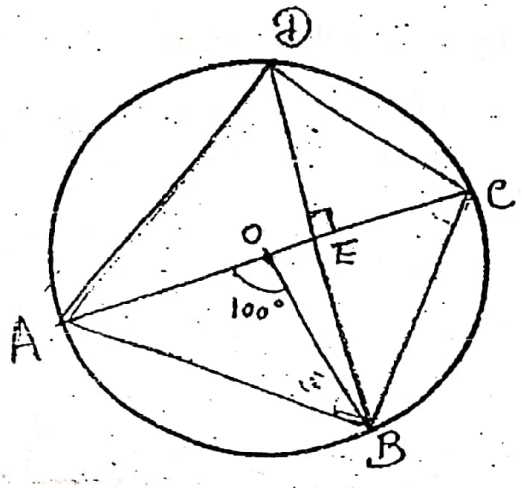
Q.VI A. Use factor theorem to show that $(3x+1)$ is a factor of the given expression (3)

$3x^3 + 4x^2 - 35x - 12$,Hence factorize the given expression completely.

B. Mr. Joseph had a recurring deposit account in a bank. He deposited rupees 400/- per month. He receives rupees 10,100/- as the maturity amount after two years at a certain rate. Calculate the rate of interest given by the bank. (3)

C. In the given figure AC is the diameter , angle DEC = 90^0 and angle AOB = 100^0. Calculate: (4)

i) Angle ACB ii) Angle BDC iii) Angle DAB



Q.VII.A. The weight of the 45 school children were recorded to the nearest kg as follows: Calculate : i) The median weight ii) The modal weight. (3)

Weight(kg) (x)	46	48	50	52	53	54	55
No: of students(f)	7	5	8	12	10	2	1

B. An exhibition tent is in the form of a cylinder surmounted by a cone. The height of the tent above the ground is 85 m and the height of the cylindrical part is 50m. If the diameter of the base of the of the cylinder is 168 m . Calculate the quantity of the canvas required to make the tent allowing 20% extra for the folding and stitching . Give your answer correct to nearest m^2, [Take $\pi = \frac{22}{7}$] (3)

C. Madhu invests rupees 9000/- partly in a company paying 5%, rupees 100 shares sold at rupees 80 and the remaining amount in other company paying 6% , rupees 50 shares at rupees 70. If the total annual dividend received is rupees 480/- . Calculate the amount invested in each company. (4)

Q.VIII.A. Find the values of 'a' and 'b' so that the given polynomial (3)

$x^3 + ax^2 + bx - 45$ has $(x+1)$ and $(x+5)$ as its factors.

B. A jar contains some blue balls and 16 green balls. If the probability of drawing a blue ball is $\frac{1}{4}^{th}$ of the green balls. Calculate the total number of the balls in the jar.

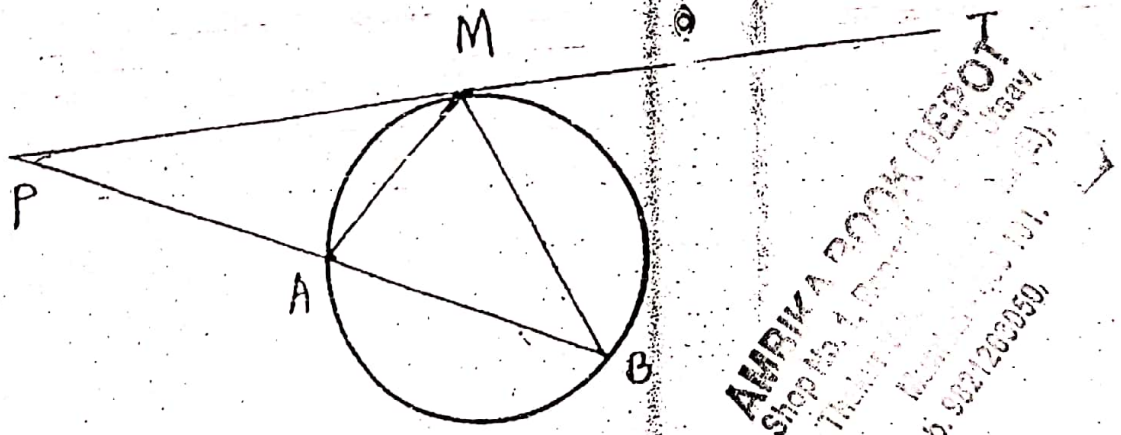
(3)

C. The angle of the jet plane from a fixed point on the ground is 60^0. After a flight of 15 seconds the angle changes to 30^0. If the jet plane is flying at a constant height of $1500\sqrt{3}$ m. Calculate the speed of the jet plane. (Draw the diagram and solve this question.) (4)

Q.IX.A. In the given figure (not drawn to the scale) PM is a tangent to the given circle. Chord AB when extended meets the tangent at point P :- (3)

i) Prove that Δ PMB $\sim \Delta$ PAM

ii) If PM = 20cm and PA = 16cm , find AB.



B. Use compass and ruler to solve this question:- (3)

Draw an inscribed circle to a regular hexagon of side 5.5cm.

C. Calculate the Mean of the following distribution table using the **Short-cut method.**

(4)

Class interval	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
Frequency	5	12	20	16	10	8	5	4

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Q.X.A. The angles of a triangle are in A.P. If the largest angle is thrice the smallest angle. Calculate the measure of all the angles of the triangle. (3)

B. Given $M = \begin{bmatrix} 4 & 1 \\ -1 & 2 \end{bmatrix}$, Find the value of 'K', if $M^2 - 6M + KI =$ 'Null Matrix' where I is the identity matrix of order 2 x 2. (3)

C. In an auditorium, seats were arranged in rows and columns. The number of rows was equal to the number of seats in each row. When the number of rows was doubled and the number seats in each row was reduced by 12, then the number of seats got increased by 1300. How many rows and seats are in the auditorium? (4)

Q.XI.A. Using properties of the proportion solve: (4)

$$\frac{\sqrt{x+1} + \sqrt{x-1}}{\sqrt{x+1} - \sqrt{x-1}} = \frac{4x-1}{2}$$

B. Use graph paper to solve this question: (6)

Using the following frequency distribution table plot the Ogive and estimate:

i) The median weight

ii) the number of students who are under weight if the 55.70kg is considered as standard.

iii) The weight above which the heaviest 30% of the student fall.

Weight (kg)	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
No: of students	5	17	22	45	51	31	20	9