GREENLAWNS HIGH SCHOOL

Std 10   **Mathematics**   **80M**

Time 2.5 hours   **Preliminary Examination**   **2024**

Attempt all questions from Section A and any four questions from Section B. All working including rough work must be clearly shown and done on the same sheet as the rest of the answer. Omission of essential steps will result in loss of marks.

Section A
(Attempt all questions from this section)

Question 1

Choose the correct answers to the questions from the given options   (15)

i) A shopkeeper bought articles worth Rs 30000 from a dealer. He sold it to a consumer at a profit of Rs 5000. If the rate of GST is 28% the tax paid by the shopkeeper is
   a) Rs 700
   b) Rs 1400
   c) Rs 70
   d) Rs 140

ii) The roots of the quadratic equation $2x^2 - x + 1 = 0$ are
   a) Real
   b) Real & equal
   c) Real & unequal
   d) Imaginary

iii) The radii of two cones are in the ratio 6:7 and their heights are in the ratio 7:3. The ratio of their volumes are
   a) 12:7
   b) 7:12
   c) 36:21
   d) 21:36

iv) The 4th term from the end of the AP 7, 11, 15, ...55 is
   a) 19
   b) 44
   c) 43
   d) 67

v) The reflection of the point (0,-9) in the X axis is
   a) (0,-9)
   b) (0,9)
   c) (-0,-9)
   d) (-0,9)

vi) In the figure drawn below AB & CD intersect at O. $\triangle AOC \sim \triangle BOD$ by
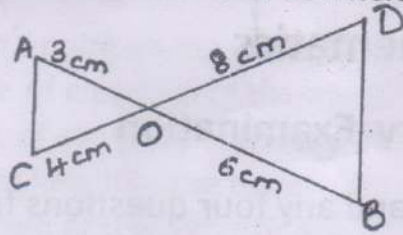
a) AA Test
b) AAA Test
c) ASA Test
d) SAS Test

vii) If $P = \begin{bmatrix} 2 & -1 \end{bmatrix}$, $Q = \begin{bmatrix} 0 & 3 \\ -1 & 2 \end{bmatrix}$ then PQ is

a) $\begin{bmatrix} 1 & 4 \end{bmatrix}$

b) $\begin{bmatrix} 1 \\ 4 \end{bmatrix}$

c) $\begin{bmatrix} 4 & 1 \end{bmatrix}$

d) $\begin{bmatrix} 1 \\ 4 \end{bmatrix}$

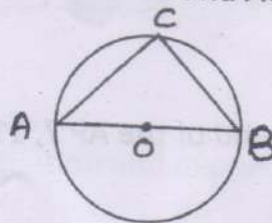viii) The mean of the given observations 5,3,x,2,6 and 8 is 7. The value of x is

a) 6
b) 14
c) 18
d) 16

ix) The midpoint of the line segment joining the points (2,3) and (-4,9) is

a) (-4,6)
b) (-1,6)
c) (1,6)
d) (4,6)

x) In the figure drawn below O is the centre of the circle and AC= BC, then $\angle CBA$ is

a) 30°
b) 60°
c) 90°
d) 45°

xi) If $-3 \leq 2(x - 1) < 7$, $x \in W$, then the least value of x is

a) 0
b) -1
c) 1
d) 2

xii) Which of the following cannot be the probability of an event

    a. $1/4$

    b. $1/2$

    c. $4/3$

    d. $3/5$

xiii) The angle of elevation of the top of the tower from a point 120m away from its base is 45°. The height of the tower is

  a) 120m

  b) 140m

  c) 130m

  d) 100m

xiv) The mean proportional between 6 and 54 is

  a) 9

  b) 16

  c) 24

  d) 18

x v) On dividing $x^3 - 2x^2 + 3x - 5$ by $x - 1$ the remainder is
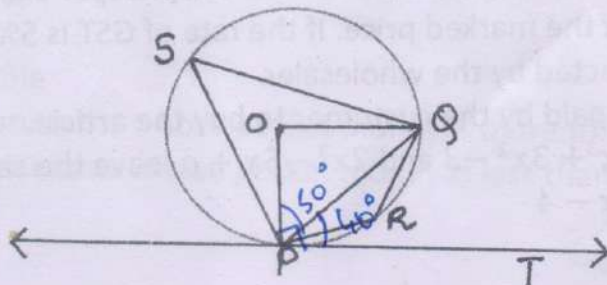
  a) -3

  b) 3

  c) 4

  d) -4

Question 2

i) A man deposits a certain amount in a recurring deposit account for 3 years at   (4)
8% p.a. if he gets Rs 7104 as interest at the time of maturity calculate his
  a) Monthly deposit
  b) Maturity value

ii) In the figure drawn below O is the centre of the circle. PT is a tangent to the   (4)
circle at P. $\angle QPT = 40°$ find $\angle PSQ$, $\angle POQ$, $\angle PRQ$, $\angle OQP$

(ii) Find the equation of the line passing through the point of intersection of the lines (4) $x + 3y = 8$ & $x - y = 4$ and parallel to the line $3x + 5y - 15 = 0$

Question 3

i) A man invests Rs 19800 in buying shares of nominal value 30 at a premium of (4) 10%. The dividend on these shares is 15% calculate
   a) The number of shares he buys
   b) The annual income
   c) The rate of return he gets on his money

ii) There are identical cards with the letters of the word 'SIMILARITY' written on (4) them. One card is drawn at random, what is the probability of getting
   a) A vowel
   b) A consonant
   c) Neither a vowel nor a consonant
   d) None of the letters of the word 'SIMILAR'

iii) Use a graph paper for this question. Take 1cm =1 unit on both axes (5)
   a) Plot A(0,6), B(4,6), C(6,0) D(4,-6) and E(0,-6)
   b) Reflect B, C & D in the Y axis and name them B', C' and D' respectively, write their coordinates.
   c) Write the equation of the line DD'
   d) Write the geometrical name of the figure BCDD'C'B'

Section B
(Attempt any 4 out of 7 questions from this section)

Question 4

i) Solve the following inequation and graph the solution on a real number line (3)
$$2x - \frac{5}{2} < x + \frac{3}{2} \le 3x + \frac{15}{2}, x \in I$$

ii) In an AP the first term is 2, the last term is 29 and the sum of all the terms (3) is 155. Find the common difference.

iii) A model of a ship is made to a scale of 1:250 find
   a) Length of the ship, if length of the model is 1.2m
   b) Area of the deck of the ship if the area of the deck of the model is 1.6m²
   c) Volume of the model if the volume of the ship is 1cubic km

Question 5

i) A shopkeeper bought an article with marked price Rs 1600 from a (3) wholesaler at a discount of 10%. The shopkeeper sells the article to the customer at the marked price. If the rate of GST is 5% then calculate
   a) GST collected by the wholesaler.
   b) Amount paid by the customer to buy the article.

ii) Find 'a' if $ax^3 + 3x^2 - 3$ and $2x^3 - 5x + a$ leave the same remainder when (3) Divided by $x - 4$

iii)   Construct a circle whose diameter is 7cm. Mark point Q at a distance of   (4)
8cm from the centre of the circle. Draw tangents from Q to this circle and
record its length. (Use a compass and ruler only)

Question 6

i)   Prove $\dfrac{\tan A + \sin A}{\tan A - \sin A} = \dfrac{secA+1}{secA-1}$ (3)

ii)   A spherical ball 28cm in diameter is melted and recast into a right   (3)
circular cone, base of which is 35cm in diameter. Find the height of the cone.

iii)   If the mean of the following distribution is 57.6 and the total number   (4)
Of observations is 50 find values of 'a' and 'b'.

CI	0-20	20-40	40-60	60-80	80-100	100-120
f	7	a	12	b	8	5

Question 7

i)   In the figure drawn below O is the centre of the circle, AE ‖ CB   (3)
$\angle DAB = 48°$, $\angle BAE = 71°$ find
a) $\angle ABE$ b) $\angle ADC$
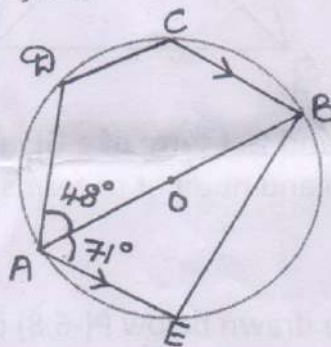
ii)   A takes 10 days less than the time taken by B to finish a piece of work   (3)
If both A and B can finish the work in 12 days, find the time taken by B to
finish the work.

iii)   Using the properties of proportion find x:y   (4)
$$\frac{x + 48x}{12x^2 + 64} = \frac{y + 108y}{18y^2 + 216}$$

Question 8

i)   The table drawn below shows the monthly pocket money of a group   (6)
of students.

Pocket Money in Rs	800-820	820-840	840-860	860-880	880-900	900-920	920-940
No of students	7	14	19	25	20	10	5

Use a graph paper for this question. Draw an ogive for the above distribution and
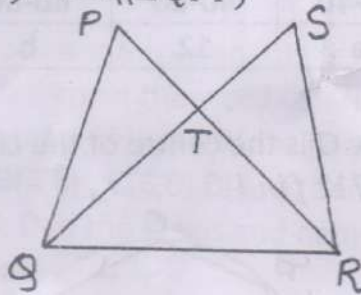find the following
a) Median
b) Upper Quartile
c) Number of students whose pocket money is more than Rs 870
d) Number of students whose pocket money is less than Rs 850

ii) From a point on the ground 40m away from the foot of a tower the (4)
angle of elevation of the top of the tower is 30°, from the same point the
angle of elevation of the top of a water tank (on top of the tower) is 45°
find a) height of the tower
b) Depth of the water tank

Question 9

i) Find matrix X such that $\begin{bmatrix} 0 & 2 \\ 1 & -1 \end{bmatrix}\begin{bmatrix} -2 & 3 \\ 1 & -1 \end{bmatrix} + 3X = \begin{bmatrix} 5 & -8 \\ 6 & 10 \end{bmatrix}$ (3)

ii) In the figure drawn below $\angle QPR = \angle QSR$, PT=3cm ST= 6cm find (4)
Area($\triangle$ RST): Area(($\triangle$ QPT)

iii) The 6th, 9th and last term of a GP are 12, 96 and 1536 respectively, find (3)
the 1st term and number of terms in the GP.

Question 10

i) In the figure drawn below P(-6,8) divides AB in the ratio 2:3, find the (3)
Coordinates of A & B
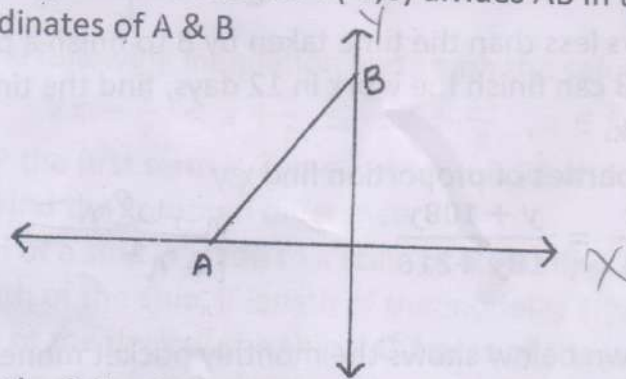
ii) Solve the following quadratic equation and express your answer correct (3)
to 2 significant figures
$$x^2 - 5x - 7 = 0$$

iii) Construct $\triangle ABC$ with BC= 6.5cm $\angle ABC = 135°$ and AB=4cm. Draw a (4)
Circle with BC as diameter. Find point P on the circumference of the circle
which is equidistant from AB & BC. Measure the length of AP (use a
compass and ruler only)