

(8)

GREENLAWNS HIGH SCHOOL
PRELIMINARY EXAMINATION YEAR 2018

SUBJECT : MATHEMATICS
TIME : 2 ½ HOURS

CLASS : X
MARKS : 80

Answers 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.

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

SECTION A (40 MARKS)

Q.1

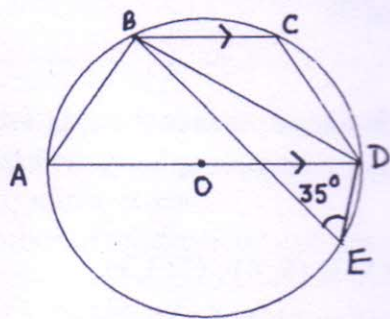
- a) Solve the following inequation and graph the solution on a number line. [3]

$$-\frac{1}{3} < x + 1 \leq \frac{2}{3} \text{ for } x \in \mathbb{R}$$

- b) Mr. Shah deposits Rs 700 per month in a recurring deposit account for 5 years. If he gets Rs 51607.50 at the time of maturity. Calculate the rate of interest. [3]
- c) If the fourth term of an AP is 24 and the ninth term is 49. Find the sum of the first 33 terms. [4]

Q.2.

- a) In the figure drawn below O is the centre of the circle and $BC \parallel AD$. [3]
If $\angle BED = 35^\circ$ find $\angle BAD$ and $\angle DBC$.



- b) A shopkeeper buys a fan at a discount of 20% from the wholesaler the printed price of the fan being Rs 1600 and the rate of VAT is 5%. The shopkeeper sells it to the customer at the printed price calculate (i) VAT paid by shopkeeper (ii) price paid by the customer. [3]

- c) If $(x - 2)$ and $(x + 3)$ are factors of $ax^3 + x^2 - bx + 6$. Find 'a' and 'b'. [4]
Hence factorise the expression completely.

Q.3

a) If $\begin{bmatrix} 2 & 4 \\ 6 & 2 \end{bmatrix} \begin{bmatrix} 3x \\ 2 \end{bmatrix} + 2 \begin{bmatrix} 3 \\ 4 \end{bmatrix} = 5 \begin{bmatrix} 4 \\ y \end{bmatrix}$, find the values of x and y [3]

- b) Find 'k' if the roots of the equation $(k + 1)x^2 + 2(k + 3)x + k + 8 = 0$ are real and equal [3]

- c) The marks obtained by 12 students are given below. [4]

Marks	68	70	72	74	76
No. of Students	4	3	2	2	1

Find the mean marks of the students to the nearest whole number.

Q.4.

a) If $\frac{x^3 + 108x}{18x^2 + 216} = \frac{y^3 + 147y}{21y^2 + 343}$, find $x : y$ using the properties of proportion. [3]

- b) A bag contains some identical cards numbered 3 to 100 and are well shuffled [3]
what is the probability that a card drawn at random is
i) a prime number
ii) a perfect square
iii) not a multiple of 8

- c) Construct a regular hexagon whose side is 3.5cm. Inscribe a circle in this hexagon and record its radius [use a compass and ruler only] [4]

SECTION B (Any 4 out of 7)

Q.5

- a) The surface area of a solid metallic sphere is 2464cm^2 . It is melted recast to make smaller spheres of radius 2cm. how many smaller spheres will be obtained. [3]

- b) If ABCD is a parallelogram such that A (3, -1), B (5, 4), C (3,3). [3]
Find the co-ordinates of D.

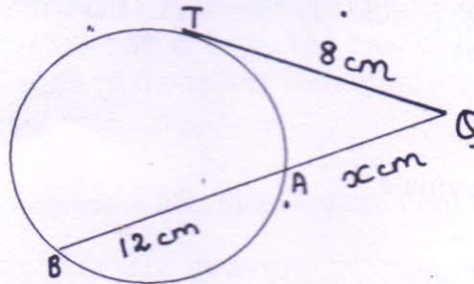
- c) Use a graph paper for this question plot points A (-2, 1), B (-4, -1) and C(-2, -3) Reflect A, B and C in the Y axis to get A', B', C' respectively. [4]
i) Write the co-ordinates of A', B' and C'
ii) Write a geometrical name for ABCC' B' A'
iii) Write the equation of the line that bisects AA'

...3/-

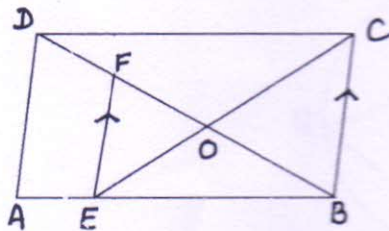
Q.6

a) Prove
$$\frac{(\cos\theta - \sin\theta)(1 + \tan\theta)}{2\cos^2\theta - 1} = \sec\theta$$
 [3]

b) In the figure drawn below QT is a tangent to the circle at T. Find x and hence length QB [3]



c) In the figure drawn below ABCD is a parallelogram, EF || BC and AE:EB = 2:3 Find (i) EF : AD (ii) A (ΔBEF) : A (ΔABD) [4]



Q.7.

a) The table below shows the distribution of the heights of 100 students. [6]

Height	110-120	120-130	130-140	140-150	150-160	160-170	170-180	180-190
No. of students	4	12	14	16	20	16	10	8

Draw an ogive for the above distribution on a graph sheet. Estimate from the ogive

- (i) median
- ii) Interquartile Range
- iii) Number of students whose height is more than 160 cm

b) From a church window 15 m high above the ground, the angles of elevation and depression of the roof and the foot of a house on the opposite side of the street are 30° and 45° respectively. Find the height of the house correct to 3 significant figures. [4]

Q.8.

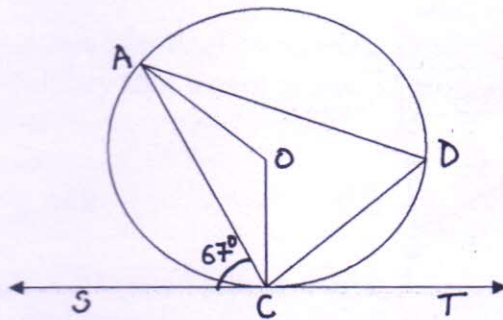
- a) Find three numbers in GP such that their product is 64 and their sum is 14 [3]
- b) A model of a building is built to a scale of 1:900 calculate.
 i) The actual length of the building in m if the length of the model is 45 cm [3]
 ii) Volume of the building in m^3 if the volume of the model is 500 l
- c) Find the equation of the perpendicular bisector of the line segment joining the points (6, -2) and (2, 4) [4]

Q.9.

- a) If $\frac{x}{a} = \frac{y}{b} = \frac{z}{c}$ then evaluate. [3]

$$\frac{ax-by}{(a+b)(x-y)} + \frac{by-cz}{(b+c)(y-z)} + \frac{(cz-ax)}{(c+a)(z-x)}$$

- b) In the figure drawn below O is centre of the circle. ST is tangent to this circle at C, find $\angle OAC$ [3]



- c) A man invests Rs 13500 partly in shares paying 6% at Rs 140 and partly in shares paying 5% at Rs 125. The face value of the shares in each case being Rs 100. If his total income is Rs 560, how much did he invest in each. [4]

Q. 10

- a) Prove the following [3]

$$\frac{1+\cos\theta - \sin^2\theta}{\sin\theta(1+\cos\theta)} = \cot\theta$$

- b) A two digit number contains the greater of the two digits at the ten's place. The product of the two digits is 32 and their difference is 4. Find the number. [3]

- c) Construct ΔPQR such that $PQ = 7$ cm. $QR = 8$ cm $\angle PQR = 60^\circ$. Locate by construction point M such that. [4]
 i) M is equidistant from P and R
 ii) M is equidistant from PQ and PR
 Measure and record the length of MQ

Q.11

a) Find Matrix X which satisfies the equation $AB + 2X = C$ where [3]

$$A = \begin{bmatrix} 3 & 7 \\ 2 & 4 \end{bmatrix} \quad B = \begin{bmatrix} 1 & 2 \\ 4 & 1 \end{bmatrix} \quad C = \begin{bmatrix} 15 & 3 \\ 2 & 4 \end{bmatrix}$$

b) A circus tent is in the shape of a cylinder surmounted by a right cone. [3]

The height of the cylindrical part is 11m. The base of the tent has a diameter of 24 m and the total height of the tent is 16m. Find the area of the canvas required to make the tent.

c) Given below are the classmarks of a distribution. Find the mode. [4]

Classmark	250	350	450	550	650	750	850
Frequency	6	18	15	10	22	12	8