

- b. Mohan has a recurring deposit account in a bank for 2 years at 6% p.a. simple interest. If he gets Rs. 1200 as interest at the time of maturity, find :
- monthly instalment
  - amount of maturity
- c. The scores obtained by 25 students in a Mathematics mental text. (3)

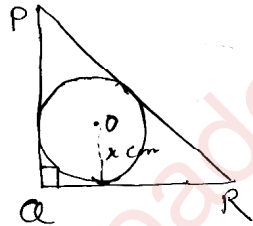
Cl.	0-10	10-20	20-30	30-40	40-50
Frequency	2	5	8	4	6

- Draw the histogram
- Calculate mode
- Determine the Model Class.

Q11. a. Prove that : (4)

$$\frac{\cos A}{1 + \sin A} + \tan A = \sec A$$

- b. In the figure given below  $PQ = 24$  cm  $QR = 7$  cm  $\angle PQR = 90^\circ$ , find the radius of the inscribed circle of  $\Delta PQR$



- c. Ashok invested Rs. 26,400 in 12%, 25 shares of a company. If he receives a dividend of Rs. 2475, find the :
- Number of shares he bought
  - Market value of each share.

## Half Yearly Examination - 2018-19

### Mathematics

**Class : X**

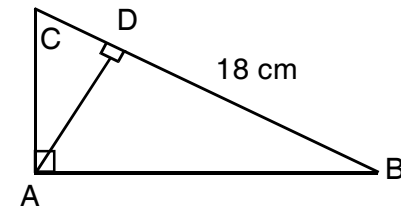
**Time : 2½ Hrs. + 15 min.**

**Full Marks : 80**

#### Section A (40)

Attempt all questions

- A recurring deposit account of Rs. 1200 per month has a maturity value of Rs. 12,440. If the rate of interest is calculated at the end of every month, find the time of this Recurring Deposit Account. (4)
  - If  $P = \{x : 7x - 4 > 5x + 2, x \in \mathbb{R}\}$  and  $Q = \{x : x - 19 \geq 1 - 3x, x \in \mathbb{R}\}$ ; find the range of set  $P \cap Q$  and represent it on a number line. (3)
  - Solve the following : (3)  
 $x - \frac{18}{x} = 6$  Give answer correct to two significant figures
- In the given figure ABC is a right angled triangle with  $\angle ABC = 90^\circ$  (4)



- Prove :  $\Delta ADB \sim \Delta CDA$
- If  $BD = 18$  cm and  $CD = 8$  cm, find AD
- Find the ratio of the area of  $\Delta ADB$  is to the area of  $\Delta CDA$

- b. Find the value of 'm' so that the equation has equal roots. Also, find the solution of each equation :

$$x^2 - (m+2)x + (m+5) = 0$$

- c. In each case given below, find : (3)

a. The order of matrix M.

b. The matrix M

i.  $M \times \begin{bmatrix} 1 & 1 \\ 0 & 2 \end{bmatrix} = [1 \ 2]$

3. a. Use the Remainder Theorem to factorise the following expression : (4)

$$2x^3 + x^2 - 13x + 6$$

- b. Cards marked with numbers 1,2,3,4, ..... 20 are well shuffled and a card is drawn at random. What is the probability that the number on the card is : (3)

i. a prime number?

ii. divisible by 3?

iii. a perfect square?

- c. Find the mean, median and mode : (3)

x.	40	41	43	45	46	49	50
f.	14	28	38	50	40	20	10

4. a. A (-2 ,4) and B (-4, 2) are reflected in the y-axis. (4)  
If A' and B' are images of A and B respectively.

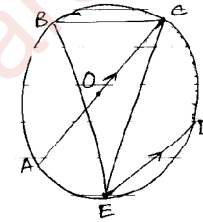
i. Find the co-ordinates of A' and B'

ii. Assign a special name to quadrilateral A A' B'B.

iii. State whether  $AB' = BA'$

- iii. The number of students who did not pass in the test if the pass percentage was 40.

- c. The figure alongside shown a circle with centre O chord ED is parallel to diameter AC and angle CBE = 64°. Find angle CED. (3)



- Q9. a. The sum of 3rd and 11th terms of an A.P. is 34. Find the sum of its 13 terms. (4)

- b. A conical tent is to accommodate 11 persons. Each person must have 4 sq. m of the space on the ground and 20 cubic metre of air to breath. Find the height of the cone.

- c. ABC is a right-angled triangle with the right angle of vertex B. BD is altitude through B. BD = 12 cm and AD = 9 cm

i. Calculate AB

ii. Name the triangles which are similar to  $\triangle ADB$

iii. Find AC.

- Q10. a. A model of a ship is made to a scale 1 : 300 (4)

i. The length of the model of the ship is 2m. Calculate the length of the ship.

ii. The area of the deck of the ship is 180000 m<sup>2</sup>. Calculate the area of the deck of the model.

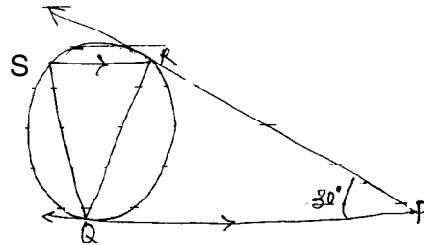
iii. The volume of the model is 6.5 m<sup>3</sup>. Calculate the volume of the ship.

- b. If  $\sec Q \cdot \sin (36^\circ + Q) = 1$ , find the value of Q (3)  
so that Q and  $36^\circ + Q$  are acute angles.
- c. In what ratio does the line  $x-y-2 = 0$  divides the (3)  
line segment joining the points (3, -1) and (8, 9)?  
Also, find co-ordinates of the point of intersection.

SECTION B (40 Marks)

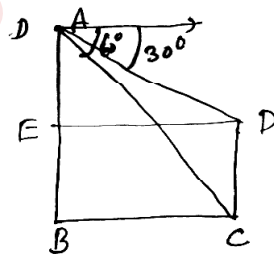
Attempt any four questions

- Q5. a. In the given figure, tangents PQ and PR are (4)  
drawn to a circle such that angle RPQ =  $30^\circ$ . A  
chord RS is drawn parallel to the tangent PQ.  
Find the angle PQS.



- b. A right circular cone is 3.6 cm high and radius (3)  
of its base is 1.6 cm. It is melted and recast into  
a right circular cone with radius of the base  
as 1.2 cm. Find its height.
- c. Find the 99th term of the series : (3)  
 $7\frac{3}{4}, 9\frac{1}{2}, 11\frac{1}{4}, \dots$

- Q6. From the top of a building AB = 60 cm high, the angle  
of depression of top and bottom of a vertical lamp CD  
are observed to be  $30^\circ$  and  $60^\circ$  respectively. Find  
(i) horizontal distance between ABC & CD.



- (ii) the height of the lamp post.

- b. Find the length of canvas, 2m in width required (2)  
make a conical tent, 12m in diameter and 12.6 m  
in slant height. Also, find the cost of canvas at  
the rate of Rs 112.50 per meter.
- c. A man desires to have an annual income of  
Rs. 36,000 from 18% Rs. 125 shares available  
at a premium of 20%. How much should he invest?

- Q7. a. Find the co-ordinates of the point Q on x-axis  
which lies on the perpendicular bisector of the line  
segment joining the points A (-5, -2) and B (4, -2).  
Name the type of the triangle QAB.
- b. Prove that :  $\frac{\cos^2 A + \tan^2 A - 1}{\sin^2 A} = \tan^2 A$  (3)
- c. A person bought a certain number of pen for (3)  
Rs. 800. If he had bought 4 pens more for the  
same money, he would have paid 10 less for each  
pen. How many pens did he buy?

- Q8. a. If (x-2) is a factor of the expression  $2x^3 + ax^2 + bx - 14$   
and when the expression is divided by (x-3), it  
leaves a remainder 52. Find the value of a and b. (4)
- b. The marks obtained by 120 students in a (6)  
mathematics test :

Marks	No of students	Marks	No. of students
9 - 10	5	50-60	18
10-20	9	60-70	11
20-30	16	70-80	6
30-40	22	80-90	4
40-50	26	90-100	3

Draw an ogive on a graph. Use the ogive drawn to estimate.

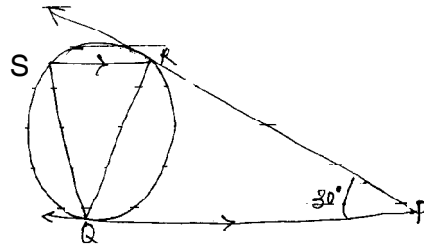
- i. the median  
ii. the number of students who obtained more than  
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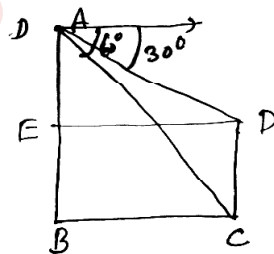
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