

Greenlawns School, Worli  
Final Examination  
Mathematics

STD: IX  
Date: 26/01/2016

Marks: 80  
Time: 2½hrs

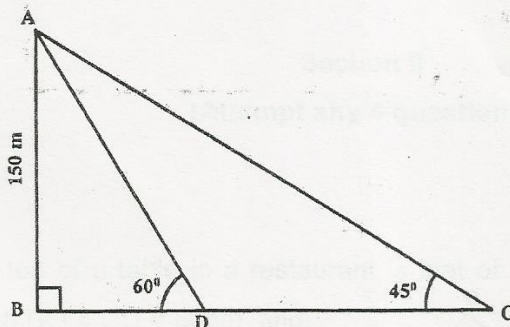
**INSTRUCTIONS:-**

- 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.
- The time given at the head of this paper is the time allowed for writing the answers.
- 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 the loss of marks.
- The intended marks for the questions or parts of question are given alongside the questions.
- Geometrical figures to be constructed wherever applicable.
- For geometry, figures have to be copied to the answer script.

**SECTION A (40 Marks)**

**Question 1**

- a. The internal and external diameters of a hollow hemispherical vessel are 21 cm and 25.2 cm respectively. Find the cost of painting it all over, at the rate of Rs. 1.50 per  $cm^2$  [3]
- b.  $\frac{\cot 54}{\tan 36} + \frac{\tan 20}{\cot 70} - 2$  [3]
- c. A man in a boat rowing away from a light house 150m high takes 2 minutes to change the angle of elevation of the top of the light house from  $60^\circ$  to  $45^\circ$ . Find the speed of the boat. [4]



**Question 2**

- a. Evaluate:  $\cos^2 25^\circ + \cos^2 65^\circ - \tan^2 45^\circ$  [3]
- b. A right circular cone is 3.6 cm high and radius of base is 1.6 cm. It is melted and recasted into a right circular cone with radius of its base as 1.2 cm. Find its height. [3]
- c. The marks obtained by 19 students of a class are given below:

27, 36, 22, 31, 25, 26, 33, 24, 37, 32, 29, 28, 36, 35, 27, 26, 32, 35 & 28. Find:

- i) Median
- ii) Lower quartile
- iii) Upper quartile
- iv) Inter-quartile range

[4]

**Question 3**

a) Find the value of  $\frac{\cos 75}{\sin 15} + \frac{\sin 12}{\cos 78} - \frac{\cos 18}{\sin 72}$  without using trigonometry tables

[3]

b. Solve for x and give your answer correct to 2 decimal places.  $x(x - 10) + 6 = 0$

[3]

c. A largest sphere is to be carved out of a right circular cylinder of radius 7 cm and height 14cm. Find the volume of sphere. (Ans correct to nearest integer).

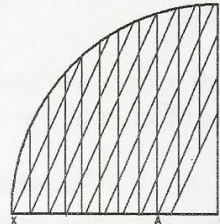
[4]

**Question 4**

a. If the mean of 6, 4, 7, a & 10 is 8. Find the value of 'a'.

[3]

b) A piece of metal is in the shape of a quarter circle of radius 14cm with OA = 3cm and OB = 4cm. If the triangular part is removed, find the area and perimeter of the remaining piece of metal.



[3]

c. Form a rectangular solid of metal 42 cm by 30 cm by 20cm, a conical cavity of diameter 14cm and depth 24 cm is drilled out. Find i) Surface area of reaming solid. ii) Volume of remaining solid. iii) Wt of material drilled out if it weighs 7gm per  $\text{cm}^3$ .

[4]

**Section II**

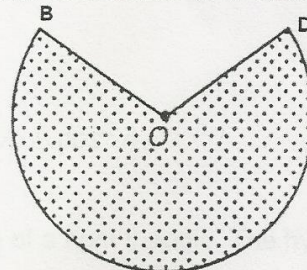
(Attempt any 4 questions)

**Question 5**

a. The shape of the top of a table in a restaurant is that of a sector of a circle with centre O and  $\angle BOD = 90^\circ$ . If  $BO = OD = 60\text{cm}$ , find:

i) Area of the top of the table.

ii) The perimeter of the table (Take  $\pi = 3.14$ )



[3]

- b. A boy scored following marks in various class tests during a term ; each test being marked out of 20 is 15,17,16,7,10,12,14,16,19,12,16

- 1-What are his modal marks?
- 2-What are his median marks?
- 3-What are his mean marks?

[3]

- c. From the data given below. Calculate mean wage correct to nearest rupee.

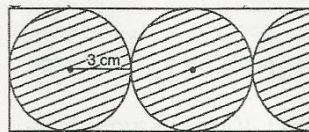
Category	A	B	C	D	E	F
Wages/day	50	60	70	80	90	100
No. of workers	2	4	8	12	10	6

- i) If the number of workers in each category is doubled, what would be new mean wage?
- ii) If wages per day in each category are increased by 60%, what is the new mean wage?

[4]

### Question 6

- a. The horizontal distance between two towers is 75 m and the angular depression of the top of the first tower as seen from the top of the second, which is 160 m high, is  $45^\circ$ . Find the height of the first tower. [3]
- b. In the given figure, find the area of the un shaded portion within the rectangle, the radius the circle is 3cm (Take  $\pi = 3.14$ ) [3]



- c. If the mean of the following distribution is 7.5. Find the missing frequency 'f'. [4]

Variable	5	6	7	8	9	10	11	12
Frequency	20	17	f	10	8	6	7	6

### Question 7

- a.  $(\operatorname{cosec} A + \sin A) (\operatorname{cosec} A - \sin A) = \cot^2 A + \cos^2 A$  [3]
- b. Factorize:  $4x^2 - 4ax + (a^2 + b^2)$  [3]
- c. Vikram wishes to fit three rods together in the shape of a right triangle. The hypotenuse is to be 2 cm longer than the base and 4cm longer than the altitude. What should be the length of the rods? [4]

### Question 8

- a. Two circles touch internally. The sum of their areas is  $170\pi \text{ cm}^2$  and the distance between their centers is 4 cm. Find the radii of the circles. [3]
- b.  $(\cos A + \sin A)^2 (\cos A - \sin A)^2 = 2$  [3]
- c. A mathematics aptitude test of 50 students was recorded as follows:

Marks	50-60	60-70	70-80	80-90	90-100
No. of students	4	8	14	19	5

Draw a histogram & hence locate the mode. [4]

### Question 9

- a. In each case given below find the value of  $\angle A$ , where  $0 \leq A \leq 90$
- $\sin(90-3A) \operatorname{cosec} 42 = 1$
  - $\cos(90-A) \sec 77 = 1$
- [4]
- b. Using a graph paper draw an Ogive for following distribution shows a record of weight in kg of 200 students.

Weight	40-45	46-50	50-55	55-60	60-65	65-70	70-75	75-80
Frequency	5	17	22	45	51	31	20	9

Use your Ogive to estimate:

- Percentage of students weighing 55 kg or more
  - Weight above which heaviest 30% of students fall
  - No. of students who are:
    - Under weight
    - Over weight if 55.70 kg is considered as standard weight
- [6]