

# City International School

ANNUAL EXAMINATION 2015 – 2016

Date : 27/02/2016

Std : IX

Subject : Mathematics

Marks : 80

Time : 2<sup>1</sup>/<sub>2</sub> hrs

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.

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 answers.

Omission of essential working will result in loss of marks.

The intended marks for questions or parts of questions are given in brackets ( )

Mathematical tables are provided.

## SECTION – A [40 MARKS]

(Attempt all questions in this section)

- Q. 1** a. Dharmesh borrowed ₹50,000 from the State Bank of India at 11% p. a. Compound Interest. At the end of the year, he repaid ₹3500 and ₹27720 at the end of the second year. Find the amount outstanding at the beginning of the third year. (3)
- b. Solve the following simultaneous equations and write your answers in one decimal place only :  $x+3y = 15$  ;  $2x-5y+10=0$  (3)
- c. The volume of a sphere is  $38808 \text{ cm}^3$ , Find its Surface Area. (4)

- Q. 2** a. The marks obtained by a set of students in an examination are given below. (3)

| Marks           | 5 | 10 | 15 | 20 | 25 | 30 |
|-----------------|---|----|----|----|----|----|
| No. of Students | 6 | 4  | 6  | 12 | y  | 4  |

Given that the mean mark of the set is 18, calculate the numerical value of y.

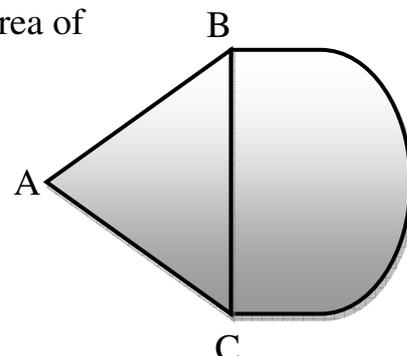
- b. Without using trigonometric tables evaluate the following. (3)

$$\frac{\sec 17^\circ}{\operatorname{cosec} 73^\circ} + \frac{\tan 68^\circ}{\cot 22^\circ} + \cos^2 44^\circ + \cos^2 46^\circ$$

- c. In an equilateral triangle ABC of side 14cm, side BC is the diameter of a semicircle as shown in the figure below. Find the area of the shaded region. (4)

(Take  $\pi = \frac{22}{7}$  and  $\sqrt{3} = 1.732$ )

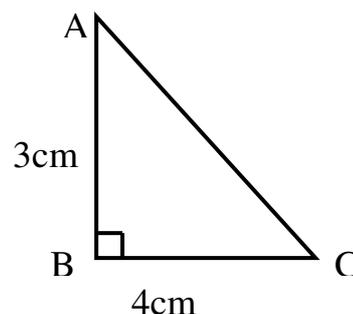
Write your answer in two decimal places.



- Q. 3** a. On a map drawn to a scale of 1:250000, a triangular plot of land has the following measurements. (3)

$AB = 3\text{cm}$ ,  $BC = 4\text{cm}$ ,  $\angle ABC = 90^\circ$ , Calculate,

- The actual length of AB in km
- The area of the plot in sq. km.



- b. Construct  $\Delta PQR$ ,  $QR = 6\text{cm}$ ,  $\angle PQR = 60^\circ$  &  $PQ = 5\text{cm}$ . Construct a circle touching the sides of the triangle (Use only ruler and compasses). Measure and record the radius of the circle drawn. (3)

- c. Find the Mean, Mode and Median of the following distribution: (4)

|   |   |   |    |    |    |
|---|---|---|----|----|----|
| x | 4 | 6 | 8  | 10 | 12 |
| f | 3 | 5 | 10 | 4  | 3  |

- Q. 4** a. Calculate the compound Interest on ₹16000 at 12% p.a. compounded half yearly for 1 year. (3)

- b. If one root of the quadratic equation  $mx^2 - 9x - 10 = 0$  is  $-\frac{5}{7}$ , find the value of m; Also find the other root. (3)

- c. Plot the points A(4,6) and B(1,2) on graph paper. (4)

- $A^1$  is the image of A when reflected in the x axis.
- $B^1$  is the image of B when reflected in line  $AA^1$
- Give a geometrical name for the figure  $ABA^1B^1$
- Write the equation of its line of symmetry.

### SECTION – B [40 MARKS]

(Solve any four questions from this section.)

- Q. 5** a. A man borrows ₹12000 at Compound Interest from a bank for a period of two Years. He finds that he has to repay ₹13230 at the end of two years to clear the loan. Find the banks rate of Interest. (3)

- b. Construct a triangle ABC in which base  $BC = 5.5\text{cm}$ ;  $AB = 6\text{cm}$  and  $\angle ABC = 120^\circ$ . (3)

- Construct a circle circumscribing the triangle ABC.
- Draw a cyclic quadrilateral ABCD so that D is equidistant from B and C.

- c. Find the mean of the following distribution by step deviation method. (4)

|                |       |       |       |       |       |       |
|----------------|-------|-------|-------|-------|-------|-------|
| Class Interval | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 |
| Frequency      | 10    | 6     | 8     | 12    | 5     | 9     |

- Q. 6** a. Solve the following quadratic equation using formula and give your answer correct to three significant figures:  $5x^2 - 3x - 4 = 0$  (3)

- b. A solid cone of radius 5cm and height 8cm is melted and recast into small spheres of radius 0.5cm. Find the number of spheres formed. (3)

- c. In a school, the money spent in the canteen by 60 students is as follows. (4)

|                    |       |       |       |       |       |
|--------------------|-------|-------|-------|-------|-------|
| Money spent (in ₹) | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 |
| No. of Students    | 6     | 16    | 22    | 13    | 3     |

Estimate the mode by drawing a histogram for the above frequency distribution.

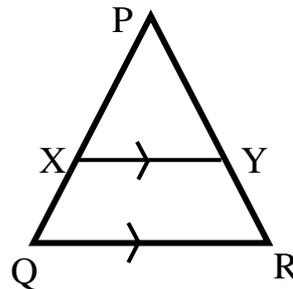
[Take 2cm = 10 units on one axis and 2cm = 5 units on the other axis]

- Q. 7** a. The following figure shows a triangle PQR in which XY is parallel to QR. (3)

If  $PX:XQ = 1:4$  and  $QR = 10\text{cm}$ ;

i. Prove that  $\triangle PXY \sim \triangle PQR$ .

ii. Find the length of XY



- b. Solve:  $73x + 27y = 19$  ;  $27x - 73y = -119$  (3)

- c. Using ruler and a pair of compasses only, (4)

i. Draw a circle with centre O and radius 4cm.

ii. Mark a point P such that  $OP = 7\text{cm}$ . Construct two tangents to the circle from P. Record the length of one of the tangent segments.

- Q. 8** a. Without solving the following quadratic equation, find the value of p for which the roots are equal.  $x^2 + (p-3)x + p = 0$  (4)

- b. The weights of 160 applicants for the army are shown below: (6)

|                   |       |       |       |       |       |       |       |       |
|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Weight (in kg)    | 50-55 | 55-60 | 60-65 | 65-70 | 70-75 | 75-80 | 80-85 | 85-90 |
| No. of applicants | 5     | 8     | 16    | 26    | 40    | 28    | 21    | 16    |

Draw an Ogive for the above data and estimate:

i. The median weight

ii. The upper and lower quartiles

- iii. The inter quartile range
- iv. If an applicant weighing less than 60kg is rejected, what is the number of applicants accepted by the army?

**Q. 9** a. Show that,  $\sqrt{\frac{1 - \cos A}{1 + \cos A}} = \frac{\sin A}{1 + \cos A}$  (3)

- b. Write down the co-ordinates of the image of the point (3, -2) when: (3)
- i. Reflected in the x axis
  - ii. Reflected in the y axis
  - iii. Reflected in the origin

- c. ABC is an isosceles right angled triangle with  $\angle ABC = 90^\circ$ . A semi-circle (4) is drawn with AC as the diameter. If  $AB=BC=7\text{cm}$ , find the area of the shaded region.

