City International School

FIRST PRELIMINARY EXAMINATION 2015 – 2016

Date : 02/12/2015 **Marks : 80**

Std : X **Subject : Mathematics** **Time :** $2^1/_2$ 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 question in this section

Q. 1 a. Find the value of 'k' if (x - 2) is a factor of $x^3 + 2x^2 - kx + 10$ **(3)**
Hence determine whether (x + 5) is also a factor.

b. Are the numbers 6, 10, 14 and 22 in proportion? If no, then what number must be added to each of them, to make them proportional? **(3)**

c. Sulochana opened a recurring deposit account in a Bank. She deposited ₹ 2500 per month for two years. At the time of maturity, she got ₹ 67500. Find **(4)**
i. The total interest earned by her ii. The rate of interest per annum

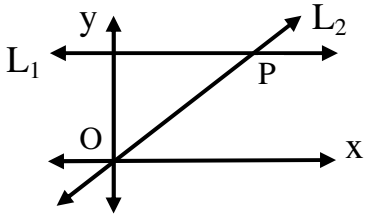
Q. 2 a. Solve the following inequation and represent the solution set on the number line. **(3)**
$$4x - 19 < \frac{3x}{5} - 2 \leq \frac{-2}{5} + x; \qquad x \in R$$

b. The ratio of monthly pocket money of A and B is 6:5 and the ratio of their expenditure is 11:9. If each saves ₹ 50, find their monthly pocket money. **(3)**

c. Mr. Dev Patil borrowed ₹ 15000 for two years. The rate of interest for the two successive years are 8% and 10% representing. If she repays ₹ 6200 at the end of the first year, find the outstanding amount at the end of the second year. **(4)**

Q. 3 a. Solve the following equation and give your answer correct to three significant figures: $x - \frac{18}{x} = 6$ **(3)**

b. Equation of line L, is y = 4 **(3)**
i. Write the slope of line L_2 if L_2 is the bisector of angle O
ii. Write the co-ordinates of point P
iii. Find the equation of L_2



c. Cards numbered from 2 to 101 are put in box and mixed thoroughly. **(4)**
One card is drawn at random. Find the probability that the card drawn is:

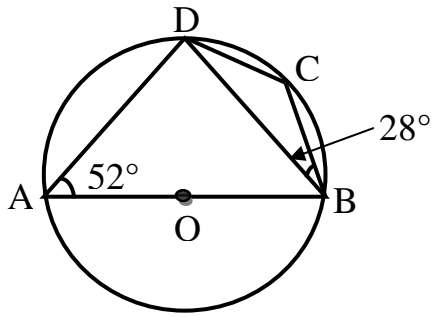
i. an odd number
ii. a doublet
iii. a perfect cube
iv. a multiple of 2 and 3

Q. 4 a. Without using trigonometrical tables, evaluate: **(3)**

$$\frac{\text{Sin } 31^\circ \ Cos\ 59^\circ + \text{Cos } 31^\circ \ \text{Sin } 59^\circ}{Sec^2\ 10 - Cot^2\ 80}$$

b. If ∠DAB = 52°, ∠CBD = 28°, find, **(3)**

i. ∠ABD
ii. ∠BCD
iv. ∠BDC



c. Use a graph paper to answer this question. Plot a histogram using the following date and estimate the mode. **(4)**

Weekly pocket money in ₹	40-49	50-59	60-69	70-79	80-89	90-100
No. of students	2	8	12	14	8	6

Take scale 2cm = 10 units on one axis and 2cm = 2 units on another axis.

Section B (40 Marks)

Attempt any four question in the section

Q. 5 a. Without solving the following quadratic equation, find the value of 'p' for which the roots an equal. **(3)**

$(p - 2)\ x^2 - 2\ (p - 3)x + 2 = 0$

b. A shopkeeper buys an article at a discount of 30% on the printed price of ₹ 2500. He sells the article to the customer at the printed price. The vat charged at each stage is 8% find. **(3)**

i. VAT paid by the shopkeeper
ii. Price paid by the shopkeeper for the article, inclusive of tax
iii. The cost to the customer inclusive of tax.

c. If the mean of the following data is 1.46, Find the value of f_1 and f_2 **(4)**

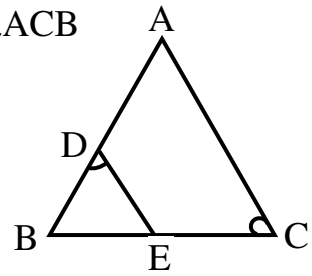
x	0	1	2	3	4	5	Total
f	46	f_1	f_2	25	10	5	200

Q. 6 a. A hollow sphere of internal and external radius 6cm and 8 cm respectively is respectively is melted and recast into small cones of base radius 2cm and height 8 cm. Find the number of cones. **(3)**

b. In the given diagram, ABC is a triangle with $\angle EDB = \angle ACB$ **(3)**

i. Prove that $\angle ABC \sim \angle EBD$

ii. If BE = 6cm, EC = 4cm, BD = 5cm and A(Δ BED) = 9 cm^2, calculate $\boldsymbol{l}$ (AB) and A(Δ ABC)



c. A shopkeeper buys a number of books for ₹ 80. If he had bought 4 more books for the same amount, each book would have cost ₹. 1 less. Taking the original number of books as x, form an equation in x and solve it. **(4)**

Q. 7 a. Use the remainder theorem to factorize the following expression completely : $2x^3+x^2 - 13x + 6$ **(3)**

b. Prove that : $\frac{tan^2\theta}{(\sec\theta-1)^2} = \frac{1+cos\theta}{1-cos\theta}$ **(3)**

c. Mr. Raj has an account is the Central Bank of India. The following entries are from his passbook. **(4)**

Date	Particular	Debit ₹	Credit ₹	Balance ₹
01.01.05	B/F			1200
07.01.05	By Cash		500.00	
17.01.05	To Cheque	400.00		
10.02.05	By Cash		800.00	
25.02.05	To Cheque	500.00		
20.09.05	By Cheque		700.00	
21.11.05	To Cheque	600.00		
05.12.05	By Cash		300.00	

i. If the rate of interest fixed by the bank in 5% p.a., find the interest due to him at the end of the year.

ii. If Raj closes the account on 4th January 2006, find the amount Mr. Raj receives on closing the account.

Q. 8 a. In what period of time will Rs.12000 yield ₹ 3972 as compound interest at 10% p.a. if compounded on a yearly basis? **(3)**

b. If the line segment with end points (3, 4) and (14, -3) meets the x axis at P. In what ratio does P divide the line segment? Also find the coordinates of P. **(3)**

c. Using the property of proportion, solve the expression for x. **(4)**

$$\frac{\sqrt{a+x} + \sqrt{a-x}}{\sqrt{a+x} - \sqrt{a-x}} = b$$

Q. 9 a. Miss Lavania invested ₹ 52000 on ₹ 100 shares at a discount of ₹ 20 paying 8% dividend. At the end of one year, he sells the shares at a premium of ₹ 20. **(3)**

Find i. The annual dividend

ii. The profit earned including his dividend

b. If $A = \begin{bmatrix} 3 & 1 \\ -2 & 2 \end{bmatrix}$ & $B = \begin{bmatrix} 1 & 3 \\ -2 & 1 \end{bmatrix}$ find the value of $A^2 - AB + 5I$ **(3)**

c. From the top of a light house 100 m high, the angles of depression of two ships on the opposite sides of it one 48° and 36° respectively. Find the distance between the ships to the nearest metre. **(4)**

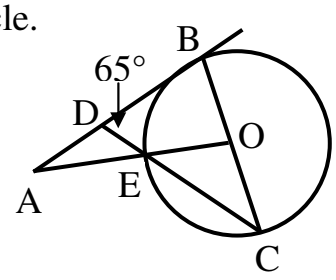
Q. 10 a. Find the equation of the straight line that passes through the point P(3, 4) and is perpendicular to the line $3x + 2y + 5 = 0$ **(3)**

b. In the following figure, O is the centre of the circle. **(3)**

AB is tangent to the circle at B.

∠BDC = 65°,

Find ∠BAD



c. Find the mean of the following distribution by shortcut method. **(4)**

CI	45-50	50-55	55-60	60-65	65-70	70-75	75-80
Frequency	5	8	30	25	14	12	6

Q. 11 a. Construct a quadrilateral ABCD in which ∠BAD = 45°, AD = AB = 6cm, BC = 3.6cm and CD = 5cm. **(4)**

i. Draw the Locus of points equidistant from BA and BC.

ii. Draw the Locus of points equidistant from points A and B.

iii. Locate point P inside the quadrilateral which is equidistant from BA and BC and also from points A and B.

iv. Record the length of PB.

b. Draw an Ogive for the following distribution which shows the scores obtained by 120 shooters in a shooting competition. **(6)**

Scours obtaining	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of Shooting	5	9	16	22	26	18	11	6	4	3

Use your ogive to estimate.

i. The median ii. The inter quartile range

iii. The number of shooters who obtained more than 75% scores.