Half Yearly Examination 2016-2017

Std. : X **Full Marks : 80**

Subject : MATHEMATICS **Time : 2 Hrs.+15mins.**

Section A
(Attempt all the question from this section)

Q1. a) On a certain sum and at a certain rate of interest, the simple interest for the first year is Rs. 270 and the compound interest for the first two years is Rs. 580.50. Find the sum and the rate of interest. [3]

b) Anish got a rebate of 8% on a refrigerator and after rebate he had to pay 12% as sales tax on it. If he paid Rs. 23,184 for it. What is the list price of the refrigerator. [3]

c) Solve the inequation and graph the solution set on the number line

$$2x - 1 \geq x + \frac{7 - x}{3} > 2 \ , \ x \in R$$ [3]

Q2. a) Find the equation of a line which has y intercept 4 and is parallel to the line $2x-3y-7 = 0$. Also find the coordinates of the point, where the line cuts x–axis.

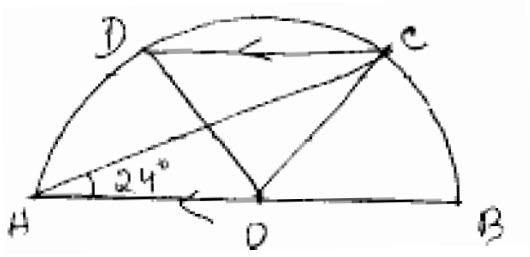
b) Find the value of x given that $B^2 = A$ where. [3]

$$B = \begin{bmatrix} 2 & 12 \\ 0 & 1 \end{bmatrix} \quad \text{and} \quad A = \begin{bmatrix} 4 & x \\ 0 & 1 \end{bmatrix}$$

c) If Q is an acute angle, solve $\dfrac{\text{Cos}^2\theta - 3\text{Cos}\theta + 2}{\text{Sin}^2\theta} = 1$ [3]

Q3. a) In the figure, AB is a diameter of the circle with centre O and CD // BA. If $\angle CAB = 24^O$ find the value of

(i) $\angle COB$ ii) $\angle DOC$ iii) $\angle DAC$ iv) $\angle ADC$



b) Kavita opened a recurring deposit account in a bank for 2 years and 6 months. If the rate of interest is 8% p.a. Find how much did she deposit each month so that she receives Rs. 8275 at the maturity time. [3]

c) When $4x^3 - 3x^2 + 7x + k$ is divided by $x + 2$, the remainder is -40. Find k.

Q4. a) Using a graph paper, plot the points A (6,4) and B (0,4) [4]

i) Reflect A and B in the origin to get the images A' and B'

ii) Write the co-ordinates of A' and B'

iii) State the geometrical name for the figure ABA'B'.

iv) Find its area and perimeter.

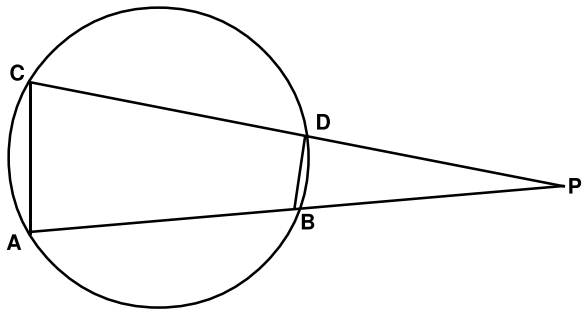
b) Find the value of m so that the equation $(4+m)x^2 + (m+1)x + 1 = 0$ [3]

c) In the figure given below, chards AB and CD of a circle meet externally at P. given that BP = 4cm, CD = 15 cm and DP = 5 cm.

i) Prove that ΔCAP and ΔBDP are similar.

ii) Find AB

iii) Find $\frac{\text{area of quadulation CABD}}{\text{area of } \Delta CAP}$



Section B [40 marks]

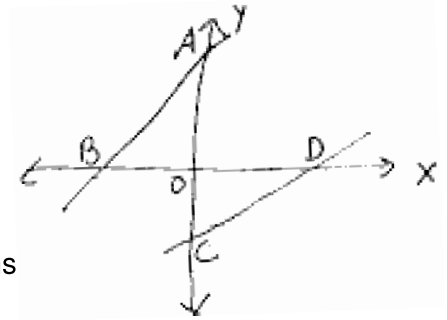
(Attempt any four questions from this section)

Q5. a) The daily wages of 160 workers in a building project are given.

Wages in Rs.	120-130	130-140	140-150	150-160	160-170	170-180	180-190	190-200
No. of workers	12	20	30	38	24	16	12	8

Using graph paper, draw an ogive for the above distribution. Use your ogive to estimate (i) the median wage of workers (ii) the % of workers who earn more than Rs. 55 a day.

b) In the figure AB and CD are the lines 2x-y+6=0 and x-2y = 4 respectively



i) Write down the coordinates of A, B, C and D.

ii) Prove that triangle OAB and ODC are similar.

iii) Is figure ABCD cyclic ? Give reasons for your ans

Q6. a) Mr. Sengupta invested Rs. 8000 in 8% (Rs. 100) shares, selling at Rs. 80. After a year he sold these shares at Rs. 75 each and invested the proceeds in Rs. 100 shares selling at Rs. 150 with a dividend of 12% (i) His income from the 1st investment. (ii) His income from the second investment (iii) The decreased percentage return on his original investment.

b) From the top of a cliff. 75m high, the angle of depression of the top and the bottom of a tower are observed to be 30° and 60° respectively. Find the height of tower.

Q7. Mrs. Rao opened a saving Bank account in State Bank of India on 9th Jan. 2008. Her pass book enteries for the year 2008 are as follows.

Mrs. Rao closes the account on 31st December 2008. If the bank pays interest at 4% p.a. find the interest Mrs. Rao receives on closing the account. Give your answer correct to the nearest rupee.

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Mrs. Rao closes the account on 31st December 2008. If the bank pays interest at 4% p.a. Find the interest Mrs. Rao receives on closing the account give your answer correct to the nearest rupee.

Date	Particulars	Withdrawals	Deposits	Balance.
Jan. 9	By cash		10000	10000
Feb. 12	By cash		15,500	25,500
April 6	To cheque	3500		
April 30	To self	2000		
July 16	By cheque		6500	
Aug. 4	To self	5500		
Aug. 20	To cheque	1200		
Dec. 12	By cash		1700	

7.b. Construct a ΔABC in which AB = AC = 5 cm and BC = 6.5cm. Using a rules and a compass only draw the reflection A' BC of ΔABC in BC. Draw lines of symmetry of the figure AB A'C.

8.a. A shopkeeper buys an article at a discount of 30% and pays sales tax at the rate of 6%. The shopkeeper sells the article to a consumer at 10% discount on the list price and charges sales tax at the same rate. If the list price of the article is 3000 find.

(i) the price inclusive of sales tax paid by the shopkeeper.

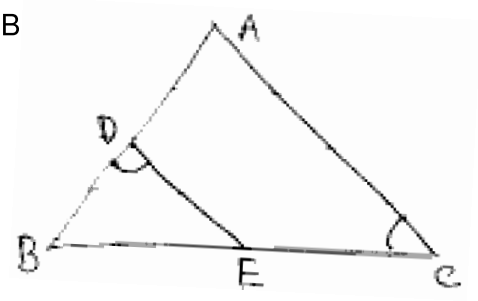
(ii) the price paid by the consumer. [4]

(iii) the vat paid by the shopkeeper.

8.b. The remainder obtained by dividing Kx^2-3x+6 by $(x-2)$ is twice the remainder obtained by dividing $3x^2+5x-k$ by $(x+3)$. Find the value of k. [3]

(c) Sole the equation $x - \frac{18}{x} = 6$. Give your answer correct to two significant figures.

9a. In the given figure. ABC is a triangle with $\angle EDB = \angle ACB$
If BE = 6 cm EC = 4 cm BD = 5 cm and
Area of $\Delta BED = 9\ cm^2$ Calculate
(i) the length of AB (ii) Area of ΔABC [4]



b. Prove $(1+\cot\theta - \operatorname{cosec}\theta)(1+\tan\theta + \sec\theta) = 2$

c. A certain sum of money is invested at the rate of 5% p.a. Compound Interest. Compounded annually. If the difference between the interests of third year and first year is Rs. 102.50. Find the sum. [5]

10.a. The sum of the areas of two squares is $640m^2$. If the difference in their perimeters is 64m. Find the sides of the two squares. [4]

b. If $P = \begin{bmatrix} 2 & 6 \\ 3 & 9 \end{bmatrix}$ $Q = \begin{bmatrix} 3 & x \\ y & 2 \end{bmatrix}$

find x and y such that PQ = O.

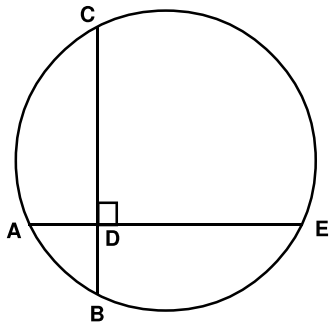
c. $A = \{ x : 11x - 5 > 7x + 3 , x \in R\}$

$B = \{ x : 18x - 9 \geq 15 + 12x, x \in R\}$

Find the range of set $A \cap B$ and represent it on a number line.

11a. In the adjoining figure AE and BC intersect each other at point D.

If $\angle CDE = 90^\circ$ AB = 5 cm BD = 4 cm and CD = 9 cm find DE [3]



b. Marks obtained by 40 students in a short assessment is given below, where a and b are two missing data

Marks	5	6	7	8	9
no. of students	6	a	16	13	b

If the mean of the distribution is 7.2. Find a & b. [3]

c. Without using trigonometrical tables, evaluate $\sin^2 34^\circ + \sin^2 56^\circ + 2 \tan 18^\circ . \tan 72^\circ - \cot^2 30^\circ$. [3]