STD:X   **MM: 80**
DATE: 26/11/2012   **TIME: 2hr 30 mins**

GENERAL INSTRUCTION
(Two hours and a half)
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 the paper is the time allowed for writing the answers.
*Attempts **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 of questions or parts of questions are
given in brackets [   ].
*Mathematical tables are provided .*

SECTION – A [40 Marks]

Question 1.

a) The list price of a refrigerator is ` 28,000 .The shopkeeper gives a discount of 12.5% on the listed price .He further gives a festival discount of 4% on the balance . But the sales tax is charged at the rate of 10% . Find the final price a customer has to pay for the refrigerator . [3]

b) If $\left(6x^2 - xy\right)\left(2xy - y^2\right) = 6:1$, find $x:y$. [3]

c) At what rate percent per annum compound interest will ` 40000 yield ` 6656 as interest in 2 years , interest compounded annually .Also find the amount after 3 years at the above rate of interest . [4]
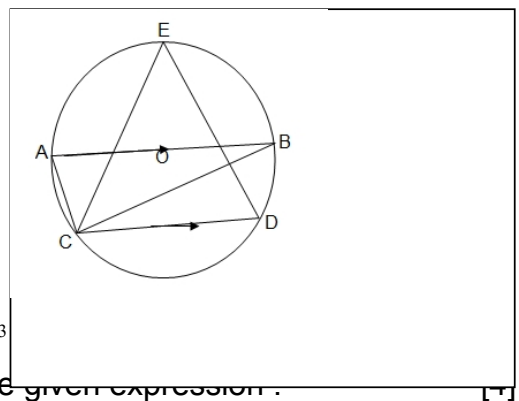
Question 2.

a) Richard has a recurring deposite account in a bank for 3 years at 8% p.a. simple interest .If he gets ` 1998 as interest at the time of maturity , find
   i.   The monthly installment
   ii. The amount of maturity [3]

b) Solve the following inequation : $x + \frac{1}{5} \langle 1\frac{1}{3}x + \frac{8}{15} \le \frac{x}{5} + 1\frac{2}{3}, x \in R$ .Graph the solution set on the number line [3]

c) In the adjoining diagram , AC is the diameter of a circle with radius 5 cm .If AB = AC and CD = 8 cm , calculate

   i.   The area of the shaded region .

   ii. The perimeter of the shaded region .

   [Take π = 3.14 and $\sqrt{2} = 1.41$] [4]
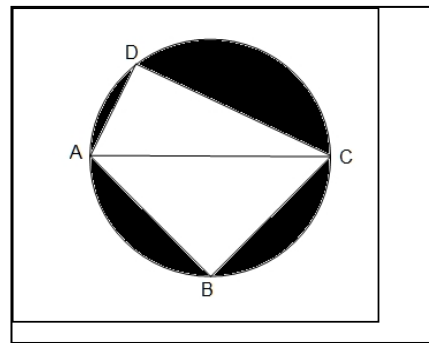
Question 3.

a) Given $A = \begin{bmatrix} 1 & 1 \\ 8 & 3 \end{bmatrix}$, evaluate A² - 4A -5I where I is a unit matrix of order 2. [3]

b) In the adjoining figure , O is the centre of a circle . Chord CD is parallel to the diameter AB . If $\angle BCD = 25°$, find $\angle CED$. [3]

c) Given that (x + 1) and (x – 2) are factors of x^3 and b .With these value of a and b , factorise the given expression . [4]

Question 4.

a) Without using trigonometric tables , evaluate :

$$\frac{3\tan 25° \tan 40° \tan 50° \tan 65° - \frac{1}{2}\tan^2 60°}{4\left(\cos^2 29° + \cos^2 61°\right)}$$ [3]

b) Using Short cut method , calculate the mean for the following frequency distribution :   [3]

Marks	10-20	20-30	30-40	40-50	50-60	60-70
No. of Students	6	8	12	15	10	9

c) Use Graph paper for this question . Take 1 cm = 1 unit on both axis . Plot the points A (2 , 3) , B (4 , 5) and C (7 , 2) .

   i.   Write the co-ordinates of A_1 , B_1 , C_1 if $\triangle A_1 B_1 C_1$ is the image of $\triangle ABC$ when reflected in the line y = 0.

   ii. Write the co-ordinates of A_2 , B_2 , C_2 if $\triangle A_2 B_2 C_2$ is the image of $\triangle A_1 B_1 C_1$ when reflected in the origin.

   iii. Write a single transformation that maps $\triangle ABC$ to $\triangle A_2 B_2 C_2$.

   iv. Assign the special name name to the quadrilateral BCC_2B_2 .Hence find its area .   [4]

*Answer any **four** questions from this section.*

Question 5.

a) Mrs. Varma borrows ` 80000 from Vijaya Bank at 13% p.a. compound interest . She repays ` 35400 at the end of first year and ` 35150 at the end of second year. Find the amount she has to pay at the end of third year to clear her entire loan .   [3]

b) If a , b , c and d are in continued proportion , prove that
a : d = triplicate ratio of (a – b) : (b – c)   [3]

c) Mrs. Chaturvedi has a saving bank account in Bank of Baroda . Her passbook has the following entries :

Date	Particular	Withdrawals in `	Deposits in `	Balance in `
April 1, 2006	B/F	…	…	13785.40
June 13	By Cash	…	2500.00	16285.40
June 26	By	…	718.65	17004.05
Sept. 8	Transfer	5000.00	…	12004.05
Nov. 18	To Self	…	3213.10	15217.15
Dec. 7	By clearing	3000.00	…	12217.15
Jan, 23 ,	To Cheque	…	9605.38	21822.53
2007	By Cheque	10000.00	…	11822.53
March , 5	By Cash			

She closes the account on March 21 , 2007 . Calculate the money she receives on closing the account , the interest being reckoned at 4% p.a.   [4]

Question 6.

a) Find the nature of the roots of the equation $x^2 + 2x + \frac{1}{3} = 0$ .If they are real , find them .   [3]

b) Two fair dice are rolled simultaneously .Find the probability of getting :

   i.   A sum of atleast 10.
   ii. A sum of atmost 4.
   iii. 12 as a product .   [3]

c) A boat takes one hour longer to go 36 km up a river than to go the same distance down the river. If the river is flowing at the rate of 1 km/ hr , find the rate at which the boat travels in still water .Give your answer correct to 2 decimal places.   [4]

Question 7.

a) Divide ` 4700 into two parts such that if one part is invested in 10% hundred –rupee shares at 10% premium and the other in 8% shares at par , the resulting incomes are equal .   [3]
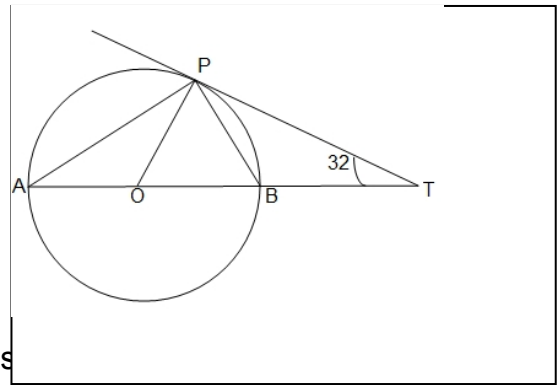
b) In the adjoining figures , O is the centre of a circle and PT is tangent to the circle at P. If $\angle OTP = 32°$, Find

   i. $\angle POT$

   ii. $\angle OAP$

   iii. $\angle BPT$ **[3]**

c) Given A (- 1 , - 2) , AB = 5 units and ABCO is origin in the ratio 1 : 2 .Find :
   i.   The co-ordinates of B and C.
   ii. The co-ordinates of P.
   iii. The co-ordinates of the mid-point of BP.   **[4]**

Question 8.

a) The following distribution shows the number of runs scored by some top batsmen of the world in one-day international cricket matches :   **[3]**

Runs Scored	Number Of batsmen
3000 – 4000	4
4000 – 5000	18
5000 – 6000	9
6000 – 7000	7
7000 – 8000	6
8000 – 9000	3
9000 - 10000	2

Draw a histogram for the above distribution and hence estimate the mood of the data.

b) If the points A (7 , 6) and C (- 5 , - 6) are opposite vertices of a Rhombus , Find the equations of its diagonal .   **[3]**

c) In the adjoining diagram , AT is the tangent to the circle centre O. If $\angle ACD = 44°$ and $\angle DAB = 104°$, Find

       $\angle ACB$

       $\angle AOB$

       $\angle BAT$
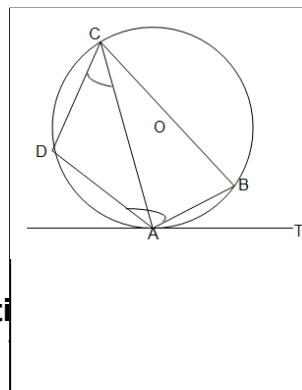
       $\angle ABD$ **[4]**

Question 9.

a) he is 12 cm and its base diameter is 10 cm. Find
   i. The volume of the cone .
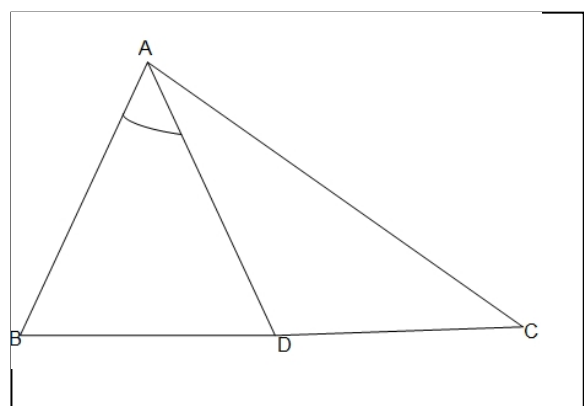   ii. The curved surface area . Take π = 3.14   **[3]**

b) Find matrix A such that $\begin{bmatrix} 2 & -3 \\ 5 & 1 \end{bmatrix} A = \begin{bmatrix} 9 & 2 \\ 14 & 22 \end{bmatrix}$.   **[3]**

c) In the adjoining figure , D is a point on BC such that $\angle BAD = \angle ACB$ and AB = 7 cm , BD = 5 cm

   i.   Prove that △DAB ≈ △ABC

   ii. Find the length of BC .

   iii. Find area of △ABC : area of △ADC.   **[4]**

Question 10.

a) Prove that $(1 + \cot A + \tan A)(\sin A - \cos A) = \dfrac{\sec A}{\cos ec^2 A} - \dfrac{\cos ec A}{\sec^2 A}$.   **[3]**

b) Using rular and compass only , construct a rhombus ABCD with side AB = 6 cm and diagonal AC = 8 cm . Draw a circle passing through the vertices A , B , and C . Does the fourth vertex D lies on this circle ?   **[3]**

c) Use ruler and compasses only for the following question :
Construct the rhombus ABCD with sides of length 4.5 cm and diagonal AC of length 6 cm .

    i.   Locate the point P on AD such that P is equidistant from B and C.
    ii. Find the locus of points inside the rhombus :
        1) Equidistant from A and C.
        2) Equidistant from the sides AB and AD .   [4]

Question 11.
  a) The angles of depression of two boats A and B in a river from the top P of a tower on the bank of the river are 30^0 and 40^0 .The height of the tower is 20 m and boats are in line with the tower and on the same side of it . Find the distance AB between the boats , correct to one decimal place .   [4]

  b) The following table gives the marks obtained by students in a test :

Marks	No. Of Students
0-10	2
10-20	5
20-30	10
30-40	8
40-50	15
50-60	20
60-70	30
70-80	15
80-90	10
90-100	5

Draw an ogive and use it to estimate the median .
Also find the lowest marks obtained by the top 25% students .   [6]