SUBJECT : MATHEMATICS   CLASS   : X
TIME   : 2 ½ HRS.   MARKS   : 80

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 answer

Omission of essential working will result in loss of marks.

SECTION A

Question 1

a) A shopkeeper buys an article whose list price is Rs. 1600 at a discount of 12.5% from a wholesaler. He sells the article to a customer at the list price and charges sales tax (under VAT) at 6.5 %.
Calculate (i) VAT paid by the shop keeper
                  (ii) price paid by the customer   [3]

b) A man invests Rs 3500 for 2 years at compound Interest. After one year his money amounts to Rs3780. Find the interest for the second year.   [3]

c) When $4x^2 + ax + 1$ is divided by $(x +3)$ the remained is 52. Find 'a' and factorise the polynomial completely.   [4]
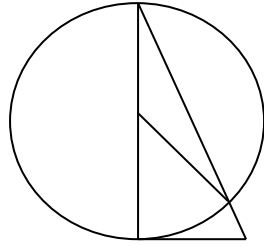
Question 2

a) If P = $\{x / 4 < 2x – 1 \le 9, x \in R\}$ [3]
                  Q = $\{x / - 2 \le 2 + 4x < 24, x \in Z\}$
           Find P   Q and represent it on a number line.

b) If $\frac{x}{y} = \frac{p}{q}$ then prove that $\frac{xy+pq}{xy-pq} = \frac{y + q}{y - q}$ [3]

c) In the figure drawn below O is the centre of the circle whose radius is 20cm. if the length of the tangent segment, AB is 9 cm find the length of SB [Express your answer correct to three significant figures] [4]

Question 3 a) If A = $\begin{bmatrix} \sin 90° & 0 \\ -1 & 1 \end{bmatrix}$ B = $\begin{bmatrix} 1 & \cosec 30 \\ 4 & -5 \end{bmatrix}$ [3]

Find matrix M such that AM = B. Also mention the order of M.

b) Instead of numbers, the letters in the word 'CACTUS' were stuck on a die. Find the probability of getting. [3]

    i) letter C
    ii) a vowel
    (iii) not getting T

c) Solve the following [4]

$$\sqrt{4-y} + \sqrt{y+9} = 5$$

Question 4.

a) Evaluate without using trigonometric tables. [3]

$$\frac{\sec 35° \times \sin 55° + \cos 35° \times \cosec 55}{\tan 1° \tan 89°} \qquad \frac{1}{3}$$

b) If the mean of the following distribution is 7.68 find q [3]

x	3	5	7	9	11	13
f	6	8	15	q	8	4

c) Construct a circle of radius 4.5 cm. Draw two tangents to the circle so that the angle between the tangents is 105°. Record the length of each tangent. [use a compass and ruler only] [4]

Question 5.

a) A page from the savings bank account of Mr. Mehta is given below. [5]

Date	Particulars	Debit	Credit	Balance
1st Jan 2010	B/F			1270
7th Jan	By cheque		2300	
9th March	To self	2000		
26th March	By cash		6500	
10th June	To cheque	4600		
15th July	By cheque		2620	
18th October	To cheque	525		
29th October	To Self	2800		
3rd November	By cash		2000	
23rd December	By transfer		2920	

Complete the entries of his passbook. Also find the amount he will receive if he closes his account on the 31st of December 2010, the rate of interest being 5%.

b) Use a graph paper for this question plot P(2,4), Q (-2,1) and R (5,0). [5]
(i) Reflect P & Q in the X – axis to get P & Q write their co-ordinates.
(ii) Write the geometrical name of his figure.
(iii) Name and write the equation of the axis of symmetry.
(iv) Name one point from the figure which is invariant in the X – axis.

Question 6.

a) In the figure drawn below OPQR is a rhombus, O is centre of the circle. If the [3]
   radius of the circle is 10 cm find the area of the rhombus correct to 2 decimal places.
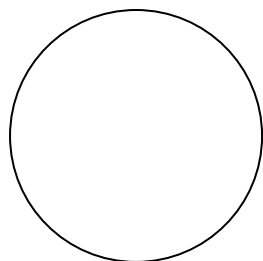

b) A man sells some shares of face value 100 at 2.25% dividend for Rs 77. [3]
   He then invests the proceeds in Rs 100 shares selling at Rs 110 paying 6%
   dividend. If his income increases by Rs 234, how many shares did he sell?

c) A model of a ship is made to a scale of 1:700 [4]

(i) If the length of the model is 4 m. calculate the length of the ship.

(ii) If the area of the deck of the ship is 14700000m^2. Calculate the area of the deck of the model.

(iii) If the volume of the model is 20 l, calculate the volume of the ship in m^3.

Question 7.

a) In the figure drawn below, the circle touches tangents AB, BD and ED at points A, C and E respectively. If AB∥DE and O is the centre of the circle. [3] Prove that ∠BOD = 90°
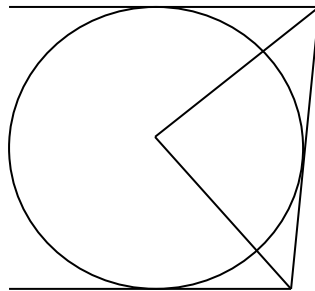
b) Calculate the mean of the following distribution by step deviation method. [3]

Class Interval	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
F	8	6	2	9	11	5	3	2	4

c) The distance from X to Y by two different routes are 81 km and 85 km. A car taking the longer route moves faster than a car taking the shorter route by a speed of 2km/hr and completes the journey in 15 mins lesser time. Find the speed of each car. [4]

Question 8.

a) Prove sec θ (1 - sinθ) (secθ + tan θ) = 1 [3]

b) If a : b = c:d then prove that $\dfrac{a + c}{b + d} = \dfrac{pa + qc}{pb + qd}$ [3]

c) P(2, -4) , Q (3,3) and R (-1,5) are vertices of Δ PQR. Find the equation of [4]

(i) The median of the triangle through P

(ii) The altitude of the triangle through Q

Question 9.

a) The table drawn below shows the marks obtained by a certain number of   [6]
   students in a test.

Marks	0 -10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of students	12	20	30	38	24	16	12	8

Draw an ogive of the given distribution using a graph sheet. Use the graph to estimate the following
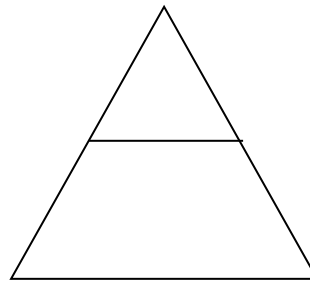
i) median marks

ii) Inter quartile range

iii) No of students who scored more than 70% marks

b) The internal and external radii of a spherical shell are 3cm and 5cm respectively. [4]
   It is melted and recast into a cone of height $10\frac{2}{3}$ cm. find the radius of the cone to
    the nearest whole number.

Question 10.

a) Δ PQR LM∥QR, PL= 2cm LQ = 6cm, QR = 20cm find (i) LM   [3]

(ii) $\dfrac{\text{Area (trapezium LMRQ)}}{\text{Area (ΔPLM)}}$

b) If (4x + 3) : (3x + 7) is the sub duplicate of the ratio 16:25. Find 'x'   [3]

c) If the depreciation for a machine costing Rs 24000 is 8%, 9% and 10% for
   three consecutive years. Find its value after three years. Also find the total   [4]
   depreciation in percentage.

Question 11.

a) Construct ΔABC such that BC = 6.2 cm AB = 5.5 cm & AC = 5 cm construct
   the locus of points equidistant from A& C construct the locus of points
   equidistant from AC & BC locate point P s.t. PA = PC & P is equidistant   [3]
   from AC & BC. Measure PB [use a compass & ruler only]

b) Mr. Shah opened a recurring deposit account in a bank. He deposited
   Rs. 2500 per month for 2 years. At the time of maturity he got Rs.67500.   [3]
   Find the rate of interest per annum.

c) The angle of elevation of a jet fighter from a point P on the ground is 60°.
   After a flight of 15 sec, the angle of elevation changes to 30°. If the jet is   [4]
   flying at a speed of 720 km/hr, find the height at which the jet is flying.