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.

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

(Attempt all questions from this section)

Question No.1

  i.   Solve the following quadratic equation and express your answer   (3)
     correct to 2 decimal places.

          $x^2 - 7x - 9 = 0$

  ii.   Mr. Das deposits Rs.400 every month in a recurring deposit account   (3)
     for 3 years at 6% p.a. Calculate the amount he will get at the time of maturity.

 iii.   The third term of an A.P. is 28 and seventh term is 44. Find the   (4)
     fifteenth term of the same A.P.

Question No.2

  i.   Solve the following linear inequation and graph the solution on a   (3)
   real number line.

$$2x - 5 \leq 5x + 4 < 11, \ x \in R$$

  ii.   If $A = \begin{bmatrix} 3 & -6 \\ 6 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ -1 & 0 \end{bmatrix}$, find $2A - 3B$ (3)

 iii.   Some identical cards numbered from 3 to 30 are well shuffled. A card   (4)
     is drawn at random what is the probability that the card has

       a) An even number between 15 and 30

       b) A prime number

       c) Neither a prime nor a composite number

       d) A multiple of 3 & 5

Question No.3

i. A metal cylinder whose radius is 8 cm and height 12 cm is melted and (3) recast into small cones each of radius 3 cm and height 4 cm. Find the number of cones formed.

ii. In the figure drawn below the centre of the circle is 0, $\angle ABC = 40°$ and (3) $\angle BOD = 120°$, find the values of x & y.
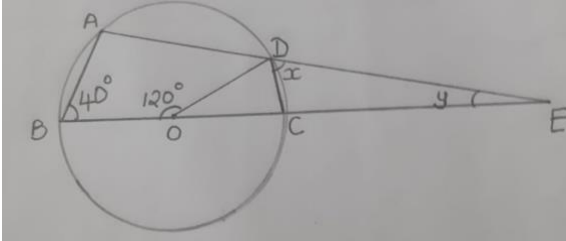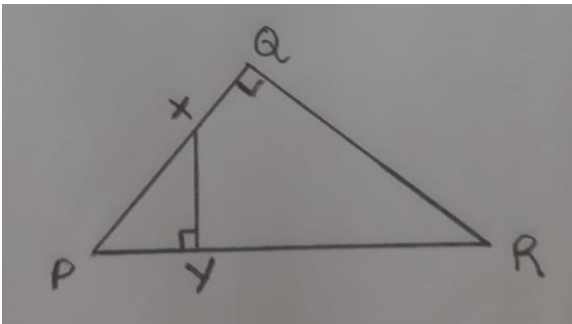

iii. Find the values of 'p' and 'q' if the mean of the following distribution (4) is 25.72 and $\Sigma f = 25$

C.I	10 - 16	16 - 22	22 - 28	28- 34	34 - 40
f	1	p	5	q	6

Question No.4

i. In the figure drawn below $XY \perp PR$ (3)

Prove a) $\Delta PQR \sim \Delta PYX$

b) If PQ = 15 cm, PY = 6 cm, PX = 3x + 4 & YR = 10x − 1 find 'x'

ii. A dealer bought certain articles from a wholesaler for Rs.26000. He (3) marks it at Rs.32,000 and sells it at a discount of 10% to the customer. If the rate of GST is 12% and all transactions are within the state. Calculate the GST paid by the dealer to the Government.

iii. Using factor theorem show that (x − 10) is a factor of $x^3 − 23x^2 + 142x − 120$. (4) Hence factorise the given expression completely.

SECTION B
(Any 4 questions out of 7)

Question No.5

i.   Mrs. Khanna opened a recurring deposit account in a bank and deposits   (3)
       Rs.1800 per month for 2 ½ years. If she received Rs.59,580 at the time of maturity,
       find the rate of interest.

ii.   Find 'k' if x =3 is a solution of the quadratic equation $(k + 2) x^2 - kx + 6 = 0$,   (3)
       hence find the other root of the equation.

iii.   Use a graph paper for this question.   (4)
       a) Plot points P(0, 5), Q(- 2, 4) and R (- 4, 0)
       b) 'P' is invariant when reflected in line L. Name line L.
       c) Reflect Q & R in line L to get Q' and R'
       d) Name the figure PQR$R'Q'$

Question No.6

i.   If A (3, 1), B (- 5, 4) and C (1, 0) are vertices of a triangle, find the equation of the
       median through A.   (3)

ii.   Find 'x' and 'y' if $\begin{pmatrix} -2 & 0 \\ 3 & 1 \end{pmatrix} \begin{pmatrix} -1 \\ 2x \end{pmatrix} + 3 \begin{pmatrix} 2 \\ 1 \end{pmatrix} = 4 \begin{pmatrix} y \\ 3 \end{pmatrix}$ (3)

iii.   In the figure drawn below 0 is the centre of the circle. PAQ is a tangent to the circle
       at A. If $\angle OBA = 42°$, find the values of x, y & z.   (4)
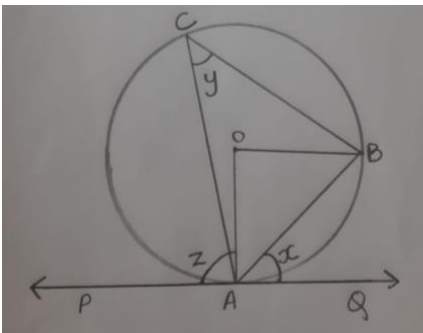
Question No.7

i.   The third term of an AP is 10 and the eighth term exceeds twice the fourth term by 5.
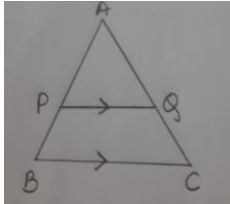   Find the sum of the first 50 terms.   (3)

ii.   Solve for 'x' using the properties of proportion   (3)

$$\frac{1 + x + x^2}{1 - x + x^2} = \frac{171(1 + x)}{172\,(1 - x)}$$

iii.   In the figure drawn below AP:PB = 1:4 & PQ ∥ BC find   (4)

        Find (a) A (Δ APQ) : A (Δ ABC)

            (b) A (Δ ABC) : A (▢ PQCB)

Question No.8

i.   Solve the following in equation and graph the solution on a number line.   (3)

$$-2\tfrac{5}{6} < \tfrac{1}{2} - \tfrac{2x}{3} \le 2 \ , \ \ x \in Z$$

ii.   If $\frac{a}{b} = \frac{c}{d}$ then prove that $\dfrac{(a + c)^3}{(b + d)^3} = \dfrac{a\,(a - b)^2}{b\,(b - d)^2}$ (3)

iii.   The volume of a cone is 1232 m³ and the area of its base is 154m², find the lateral surface area.   (4)

Question No.9

i.   In the figure drawn below 0 is the centre of the circle. PA and PB are tangents to the circle at A and B respectively. Find the values of x & y.   (3)
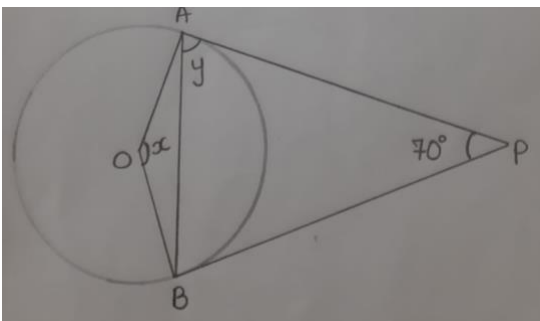
ii.   Prove that $\dfrac{\tan \theta + \sec \theta - 1}{\tan \theta - \sec \theta + 1} = \sec \theta + \tan \theta$ (3)

iii.   Estimate the mode of the following distribution.   (4)

C I	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
f	12	18	27	20	17	6

Question No.10

i. The line segment joining P(- 2, 3) and Q(6, - 5) is intersected by the Y axis at K. Write the abscissa of K and find the ratio in which K divides PQ. (3)

ii. Ram bought a certain number of articles for Rs.600. If the cost per article (3) were Rs.5 more, the number of articles that could be bought for Rs.600 would be 4 less. Find the original number of articles bought.

iii. A dealer in Mumbai supplied goods to a wholesaler within the same city. The details of the transaction are given below in the table. Find the total amount of the bill if the rate of GST is 18%. (4)

Goods	A	B	C	D
MRP	12000	15000	22000	9000
Discount	10%	40%	12%	5%

Question No.11

i. The distribution drawn below shows the weekly pocket money received by a group of children. (6)

Pocket Money	600 - 700	700 - 800	800 - 900	900 - 1000	1000 - 1100	1100 - 1200	1200 - 1300
No. of children	20	18	16	16	15	10	5

Draw an ogive for the above distribution and use it to find

a) Median pocket money
b) Upper Quartile
c) Number of children whose pocket money is more than 1200
d) Number of children whose pocket money is less than 750

ii. A man standing on a window of the first floor of a building observes that the angle of depression of a bench which is 20 m from the foot of the building is 45°. He climbs to the second floor of the same building and observes the angle of depression of the bench to be 60°. Calculate the height of the second floor from the ground. (4)

****