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 of 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 (40 marks)

Q.I. 1. Solve the following inequation and graph the solution on a number line   [3]

$-3 \leq 3 - 2x < 9, \quad x \in R$

2) using the properties of proportion, solve the following equation.   [3]

$$\frac{\sqrt{x+5} + \sqrt{x-16}}{\sqrt{x+5} - \sqrt{x-16}} = \frac{7}{3}$$

3) A right circular cylinder having diameter 18 cm and height 24cm is full with   [4] ice cream. The ice cream is to be filled in cones of height 12 cm and diameter 6cm having a hemispherical shape on the top. Find the number of such cones which can be filled with ice cream.

Q.II.

1) A trader buys a machine from a manufacturer at a discount of 30%, printed   [3] price being Rs.20,000 and GST being charged at 12%. He then sells it to a customer at the printed price, GST charged at same rate. Find the GST paid by the trader and the total amount paid by the final customer.

2) The 4th and 9th term of a GP are 8 and 256 respectively. Find the GP.   [3]

3) If $x - 1$ and $x - 2$ are factors of $x^3 - ax^2 + bx - 8$, find 'a' and 'b'. Hence   [4] factorize the expression completely.

Q.III.   [3]

1) If $A = \begin{bmatrix} 9 & 1 \\ 5 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 5 \\ 7 & -11 \end{bmatrix}$, find matrix X such that $3A + 5B - 2X = 0$

....2/-

2)
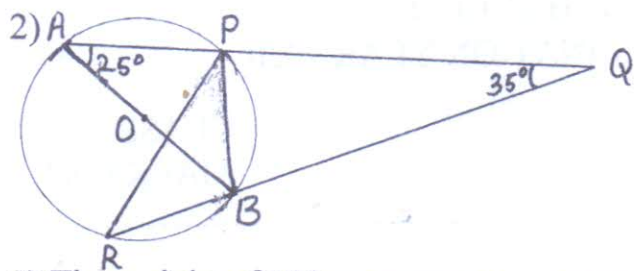
In the figure given alongside, in circle with centre O, APQ and RBQ are straight lines. ∠PAB = 25° and ∠PQB = 35°. Find ∠BPR. [3]

3) The weight of 100 mangoes were recorded as given below. Calculate the mean [4] weight of a mango to the nearest whole number using step deviation method.

Weight in grams	80-85	85-90	90-95	95-100	100-105	105-110	110-115
No. of mangoes	10	16	20	24	16	8	6

Q.IV.

1) Mahesh invests Rs.1,17,000 in certain shares having nominal value of Rs.150 and at a premium of 30%. He then divides the shares in 3 equal parts and sells them each at Rs.250, Rs.225 and Rs.175 respectively. Find Mahesh's total gain or loss in the complete transaction. [3]

2) A box contains cards numbered 3,4,5…..27. A card is drawn at random. Find the probability that the number on the drawn card is (i) a multiple of 3 (ii) a perfect square (iii) a prime number less than 15. [3]

3) Using compass and ruler only construct a circumcircle to a regular hexagon of side 4.5 cm. Measure its radius. [4]

SECTION – B
(Attempt any 4 out of 7)

Q.V.

1) Which term of the AP 4,9.19 ….is 55 more than its 15th term? [3]

2) Find the value of 'k' for which $x^2 - 2(k-1)x + (k+5) = 0$ has equal and real roots. [3]

3) Using a ruler and compass only construct triangle ABC with AB = 7cm, BC = 8 cm and ∠ABC = 60°. Now [4]

i) Construct the locus of points equidistant from BA and BC

ii) Construct the locus of points equidistant from B and C

iii) Mark the point which satisfies the above two loci as X. Measure XC.

Q.VI.

1) Prove that $\dfrac{1+\sin\theta}{1-\sin\theta} = 1 + 2.\dfrac{\tan\theta}{\cos\theta} + 2\tan^2\theta$ [3]

2) Jash has 5 years recurring deposit account in State Bank. He deposits Rs.240 per month at 9% per annum. Calculate the amount he will get on maturity. [3]

3) Use a graph paper for this question [4]

i) Plot points A (-5,5) and B (3,3)

ii) Reflect A and B in the origin to get A and B . Write their co-ordinates.

iii) Give the geometrical name for the figure

iv) Name a point that is invariant in the x axis.

Q.VII.

1) The ratio of areas of two similar triangles, $\triangle$ ABC and $\triangle$ KLM is $8x + 1$ [3]
and the ratio of their corresponding sides AB and KL is $x + 2$. Find the
value of x.

2)
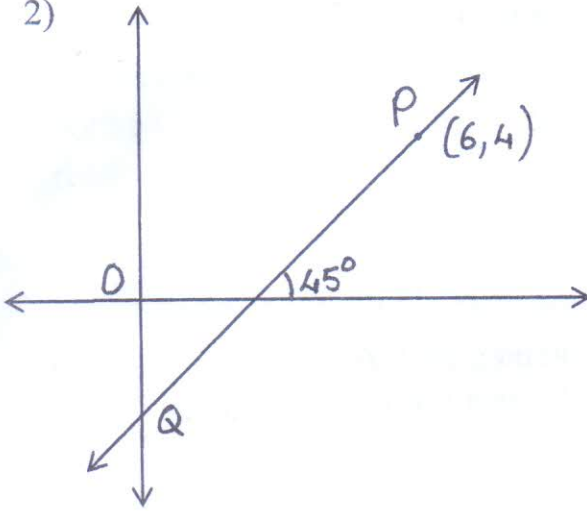
The line through P (6,4) intersects Y [3]
axis at Q.

Find i) the slope of line PQ
ii) the equation of line PQ
iii) the co-ordinates of Q

3) From the top of a building 50 m high, the angles of depression of the top [4]
and the bottom of a vertical lamp post are observed to be $30°$ and $45°$
respectively. Find
i) the horizontal distance between the building and the lamppost
ii) the height of the lamp post correct to two decimal places.

Q.VIII.

1) A manufacturer A in Gujarat manufactures a machine and marks it at [3]
Rs.75,000. He sells the machine to a wholesaler in Madhya Pradesh at a
discount of 20%. The wholesaler sells the machine to a dealer in Mumbai at
discount of 10% on the market price. If the rate of GST is 28%, find the tax
paid by the wholesaler to the central government.

2) What number must be added to each of the numbers 6,10,14 and 22 to make [3]
them proportional?

3) Find the value of 'a' and 'b' if the mean of the following distribution is [4]
7.2 and $\varepsilon f = 40$.

x	5	6	7	8	9
f	6	a	16	13	b

Q.IX.

1) By increasing the speed of a car by 10 km/ hr the time taken to cover a distance [3]
of 72 km is reduced by 36 minutes. Find the original speed of the car.

2) A hollow copper pipe of inner diameter 24 cm and outer diameter 26 cm is
melted into another solid cylinder of same height as that of the pipe. Find the [3]
diameter of the solid cylinder.

3)
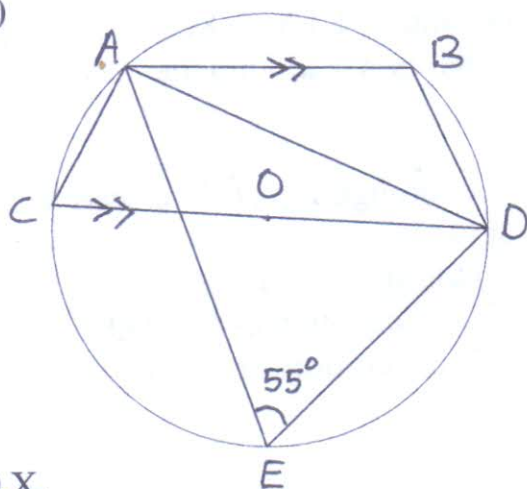
In a circle with centre O, AB is parallel to CD, ∠AED = 55°. Calculate
i) ∠ACD   ii) ∠ BAD
iii) ∠BDC   iv) ∠ABD.
Give reasons.

Q.X.

1) The table shows the distribution of the marks obtained by 160 students [6]
in a competitive exam. Draw an ojive on a graph sheet for the distribution
taking 1cm = 10 marks and 1 cm = 10 students.

Marks	Students
0-10	9
10-20	13
20-30	20
30-40	26
40-50	30
50-60	22
60-70	15
70-80	10
80-90	8
90-100	7

Use the ojive to estimate
i) the median
ii) the interquartile range
iii) the number of shooters who obtained
more than 85% marks.

2) The scale of a map is 1:250000A rectangular plot of land ABCD has the following
measurements AB = 12cm and BC = 16cm. calculate [4]
i) the diagonal distance of the plot in km.
ii) the area of the plot in km^2.

Q.XI.

1) Find the tenth term and the sum of the first 18 terms of the arithmetic progression
3,8,13,18,23,…….. [3]
2) Find the slope of the line passing through the points A (-4, 6) and B (-2,8). [3]
Write the equation of a line that is perpendicular to AB at A.

3) Given A = $\begin{bmatrix} 4 & -3 \\ 5 & 2 \end{bmatrix}$ and B = $\begin{bmatrix} 1 & 0 \\ -7 & 6 \end{bmatrix}$ find $2A + B^2 - AB$ [4]