QUEST CLASSES

ICSE Board
Class X Mathematics
Sample Paper 4

Time: 2½ hrs   **Total Marks: 80**

General Instructions:
1. Answers to this paper must be written on the paper provided separately.
2. You will **NOT** be allowed to write during the first 15 minutes. This time is to be spent in reading the question paper.
3. The time given at the head of this paper is the time allowed for writing the answers.
4. This question paper is divided into two Sections. Attempt **all** questions from **Section A** and any **four** questions from **Section B**.
5. Intended marks for questions or parts of questions are given in brackets along the questions.
6. All working, including rough work, must be clearly shown and should be done on the same sheet as the rest of the answer. Omission of essential working will result in loss of marks.
7. Mathematical tables are provided.

SECTION – A (40 Marks)
*(Answer **all questions** from this Section)*

Q. 1.

(a) If (x - 2) is a factor of the expression $2x^3 + ax^2 + bx - 14$ and when the expression is divided by (x - 3), it leaves a remainder 52, find the values of a and b

[3]

(b)
If $A = \begin{bmatrix} 3 & 7 \\ 2 & 4 \end{bmatrix}, B = \begin{bmatrix} 0 & 2 \\ 5 & 3 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & -5 \\ -4 & 6 \end{bmatrix}$.
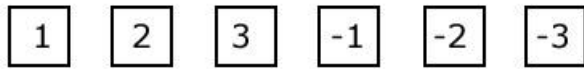Find: AB – 5C.

[3]

(c) The sum of three consecutive terms of an A.P. is 21 and the sum of their squares is 165. Find these terms

[4]

Q. 2.

(a) A die has 6 faces marked by the given numbers as shown below:

$$\boxed{1} \quad \boxed{2} \quad \boxed{3} \quad \boxed{-1} \quad \boxed{-2} \quad \boxed{-3}$$

The die is thrown once. What is the probability of getting

    i. a positive integer?
    ii. an integer greater than -3?
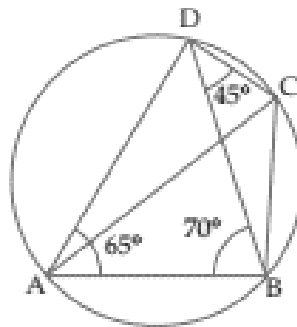   iii. the smallest integer?

[3]

(b) Find the value of 'p', if the following quadratic equations have equal roots :

$x^2 + (p - 3)x + p = 0$ [3]

(c) In the given figure, $\angle BAD = 65°$, $\angle ABD = 70°$, $\angle BDC = 45°$

(i) Prove that AC is a diameter of the circle.

(ii) Find $\angle ACB$.

[4]

Q. 3.

(a) Mr. Britto deposits a certain sum of money each month in a Recurring Deposit Account of a bank. If the rate of interest is of 8% per annum and Mr. Britto gets 8,088 from the bank after 3 years, find the value of his monthly instalment. [3]

(b) A metal pipe has a bore (inner diameter) of 5 cm. The pipe is 5 mm thick all round. Find the weight, in kg, of 2 metres of the pipe if 1 cm³ of the metal weights 7.7g. [3]

(c) Find the length of the median through the vertex A of triangle ABC whose vertices are A (7, -3), B(5, 3) and C(3, -1). [4]

Q. 4.

(a) Solve the following inequation, write the solution set and represent it on the number line:

$$-\frac{x}{3} \le \frac{x}{2} - 1\frac{1}{3} < \frac{1}{6}, x \in R$$ [3]

(b) Evaluate

$\sin^2 34° + \sin^2 56° + 2\tan 18° \tan 72° - \cot^2 30°$ [3]

(c) For the following frequency distribution, draw a histogram. Hence, calculate the mode.

Class :	5-10	10-15	15-20	20-25	25-30
Frequency	7	18	10	8	5

[4]

SECTION – B (40 Marks)
*(Answer **any four questions** from this Section)*

Q. 5.

(a) The marked price of two articles A and B together is ` 6,000. The sales tax on article A is 8% and that on article B is 10%. If on selling both the articles, the total sales tax collected is ` 552, find the marked price of collected of the articles A and B. [3]

(b) The radius of a solid right circular cylinder increases by 20% and its height decreases by 20%. Find the percentage change in its volume. [3]

(c) Point A(1,-5) is mapped as A′ on reflection in the line y=1. The point B(-5,1) is mapped as B′ on reflection in the line y=4. Write the co-ordinates of A′ and B′. Calculate AB′. [4]

Q. 6.
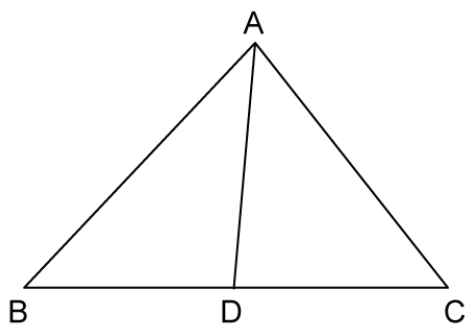
(a) ABCD is a square. If the coordinates of A and C are (5, 4) and (-1, 6); find the coordinates of B and D.   [3]

(b) Solve : $\dfrac{x}{3} + \dfrac{3}{6-x} = \dfrac{2(6+x)}{15} ; (x \neq 6)$ [3]

(c) In ΔABC, ∠ABC = ∠DAC, AB = 8 cm, AC = 4 cm and AD = 5 cm.

Find area of ΔACD : area of ΔABC.

[4]

Q. 7.

(a)
If $(p-x) : (q-x)$ be the duplicate ratio of $p : q$

then show that: $\dfrac{1}{p} + \dfrac{1}{q} = \dfrac{1}{x}$ [3]

(b) If $A = \begin{bmatrix} 3 & x \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 9 & 16 \\ 0 & -y \end{bmatrix}$, find x and y when $A^2 = B$.   [3]

(c) Find the arithmetic mean (correct to the nearest whole-number) by using step-deviation method.

x	5	10	15	20	25	30	35	40	45	50
f	20	43	75	67	72	45	39	9	8	6

[4]

Q. 8.

(a) The income of the parents of 100 students in a class in a certain university are tabulated below.

Income (in thousand Rs)	0-8	8-16	16-24	24-32	32-40
No. of students	8	35	35	14	8

   (i)   Draw a cumulative frequency curve to estimate the median income.
   (ii) If 15% of the students are given freeships on the basis of the basis of the income of their parents, find the annual income of parents, below which the freeships will be awarded.
   (iii) Calculate the Arithmetic mean.   [6]

(b) In Δ ABC, angle ABC is equal to twice the angle ACB, and bisector of angle ABC meets the opposite side at point P. Show that :CB : BA = CP : PA   [4]

Q. 9.

(a) Mrs. Kulkarni invests `1, 31,040 in buying `100 shares at a discount of 9%. She sells shares worth `72,000 at a premium of 10% and the rest at a discount of 5%. Find her total gain or loss on the whole..   [3]

(b) Construct a triangle ABC with AB = 5.5 cm, AC = 6 cm and ∠BAC = 105°. Hence :

   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 P. Measure and write the length of PC.   [3]

(c) Prove the identity $(\sin \theta + \cos \theta)(\tan \theta + \cot \theta) = \sec \theta + \csc \theta$.   [4]

Q. 10.

(a)

If the mth term of an A.P is $\dfrac{1}{n}$ and the nth term of it is $\dfrac{1}{m}$,

show that: $(mn)^{th}$ term of this A.P. is 1.

[3]

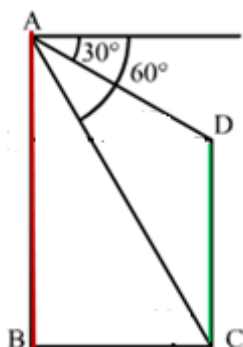(b) If a, b and c are in G.P., prove that: $\log a^n$, $\log b^n$ and $\log c^n$ are in A.P. [3]

(c) In the given figure, from the top of a building AB = 60 m high, the angles of depression of the top and bottom of a vertical lamp post CD are observed to be 30° and 60° respectively. Find :

(i) the horizontal distance between AB and CD.
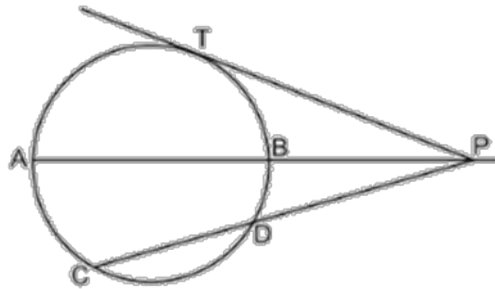
(ii) the height of the lamp post. [4]

Q. 11.

(a) In the given figure, diameter AB and chord CD of a circle meet at P. PT is a tangent to the circle at T. CD = 7.8 cm, PD = 5 cm, PB = 4 cm. Find

(i) AB.

(ii) the length of tangent PT.

[3]

(b) Solve : $\dfrac{x}{3} + \dfrac{3}{6-x} = \dfrac{2(6+x)}{15}$; $(x \neq 6)$.

[3]

(c) Find the equation of line through the intersection of lines 2x - y = 1 and 3x + 2y = -9 and making an angle of 30° with positive direction of x-axis.

[4]