

MATHEMATICS

(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 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.

The intended marks for questions or parts of questions are given in brackets [].

Mathematical tables are provided.

SECTION A (40 Marks)

Attempt **all** questions from this Section.

Question 1

- (a) Rationalize the denominator: [3]

$$\frac{14}{5\sqrt{3} - \sqrt{5}}$$

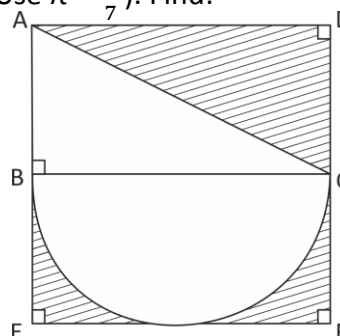
- (b) Factorize the given expression completely: [3]

$$6x^2 + 7x - 5$$

- (c) In the given figure, $AB = \frac{1}{2} BC$, where $BC = 14$ cm (Use $\pi = \frac{22}{7}$). Find: [4]

- (i) Area of quad. AEFD
- (ii) Area of $\triangle ABC$
- (iii) Area of semicircle.

Hence find the area of shaded region.



This paper consists of 7 printed pages.

Question 2

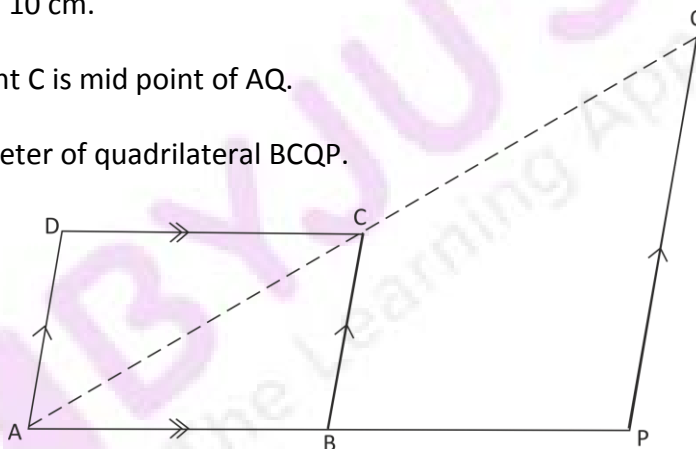
- (a) Mr. Ravi borrows ₹ 16,000 for 2 years. The rate of interest for the two successive years are 10% and 12% respectively. If he repays ₹ 5,600 at the end of first year, find the amount outstanding at the end of the second year. [3]

- (b) Simplify: [3]

$$\left(\frac{8}{27}\right)^{-\frac{1}{3}} \times \left(\frac{25}{4}\right)^{\frac{1}{2}} \times \left(\frac{4}{9}\right)^0 + \left(\frac{125}{64}\right)^{\frac{1}{3}}$$

- (c) In the given figure, ABCD is a parallelogram. AB is produced to P, such that AB = BP and PQ is drawn parallel to BC to meet AC produced at Q. Given AB = 8 cm, AD = 5 cm, AC = 10 cm. [4]

- (i) Prove that point C is mid point of AQ.
(ii) Find the perimeter of quadrilateral BCQP.



Question 3

- (a) Solve following pairs of linear equations using cross-multiplication method: [3]

$$5x - 3y = 2$$

$$4x + 7y = -3$$

- (b) Without using tables, evaluate: [3]

$$4 \tan 60^\circ \sec 30^\circ + \frac{\sin 31^\circ \sec 59^\circ + \cot 59^\circ \cot 31^\circ}{8 \sin^2 30^\circ - \tan^2 45^\circ}$$

- (c) Construct a frequency polygon for the following frequency distribution, using a graph sheet. [4]

| Marks | 40 – 50 | 50 – 60 | 60 – 70 | 70 – 80 | 80 – 90 | 90 – 100 |
|-----------------|---------|---------|---------|---------|---------|----------|
| No. of students | 7 | 18 | 26 | 37 | 20 | 6 |

Use 2 cm = 10 marks

2 cm = 5 students

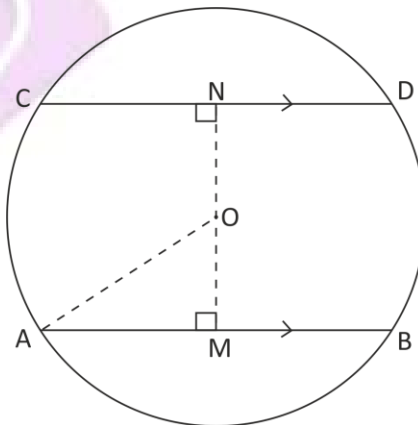
Question 4

- (a) Evaluate : [3]

$$3\log 2 - \frac{1}{3}\log 27 + \log 12 - \log 4 + 3\log 5$$

- (b) If $x - \frac{1}{x} = 3$, Evaluate $x^3 - \frac{1}{x^3}$ [3]

- (c) In the given diagram 'O' is the centre of the circle and AB is parallel to CD. [4]
AB = 24 cm and distance between the chords AB and CD is 17 cm. If the radius of the circle is 13 cm, find the length of the chord CD.



SECTION B (40 Marks)

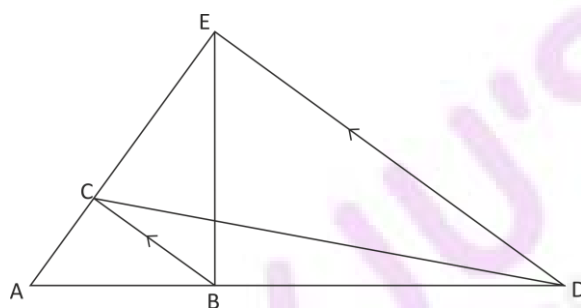
Attempt any **four** questions from this Section

Question 5

- (a) Find the coordinates of the points on Y-axis which are at a distance of $5\sqrt{2}$ units from the point (5,8). [3]

- (b) In the given figure BC is parallel to DE. Prove that: [3]

$$\text{area } \triangle ABE = \text{area } \triangle ACD$$



- (c) A sum of ₹ 12,500 is deposited for $1\frac{1}{2}$ years, compounded half yearly. It amounts to ₹ 13,000/- at the end of first half year. Find: [4]

- The rate of interest
- The final amount. Give your answer correct to the nearest rupee.

Question 6

- (a) Construct a prallelogram ABCD in which $AB = 6.4$ cm, $AD = 5.2$ cm and **the perpendicular** distance between AB and DC is 4 cm. [3]

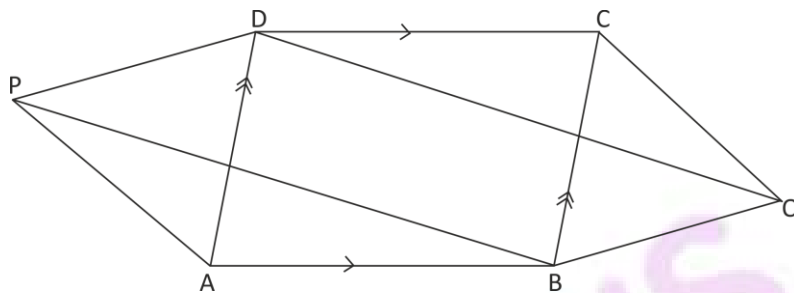
- (b) Factorize: [3]

$$4a^2 - 9b^2 - 16c^2 + 24bc$$

- (c) In the given diagram ABCD is a parallelogram. $\triangle APD$ and $\triangle BQC$ are equilateral triangles. Prove that: [4]

(i) $\angle PAB = \angle QCD$

(ii) $PB = QD$



Question 7

- (a) Solve for x ; where $0^\circ \leq x \leq 90^\circ$ [3]

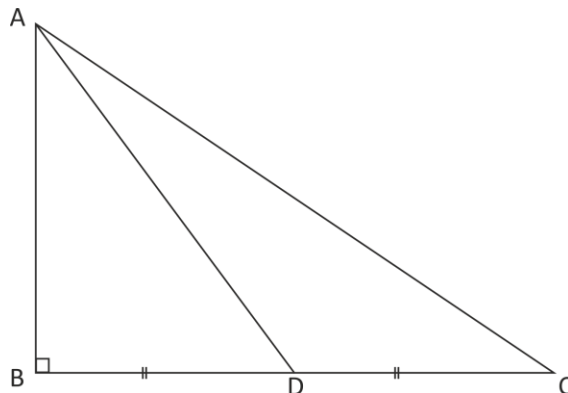
$$\sin^2 x + \cos^2 30^\circ = \frac{5}{4}$$

- (b) Evaluate for x : [3]

$$\left(\sqrt{\frac{5}{3}}\right)^{x-8} = \left(\frac{27}{125}\right)^{2x-3}$$

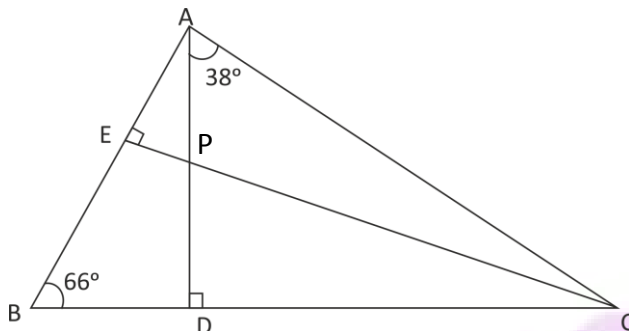
- (c) In the given figure, triangle ABC is a right angle triangle with $\angle B = 90^\circ$ and D is mid point of side BC. Prove that: [4]

$$AC^2 = AD^2 + 3CD^2$$



Question 8

- (a) In the given figure $\angle ABC = 66^\circ$, $\angle DAC = 38^\circ$. CE is perpendicular to AB and AD is perpendicular to BC. Prove that: $CP > AP$ [3]

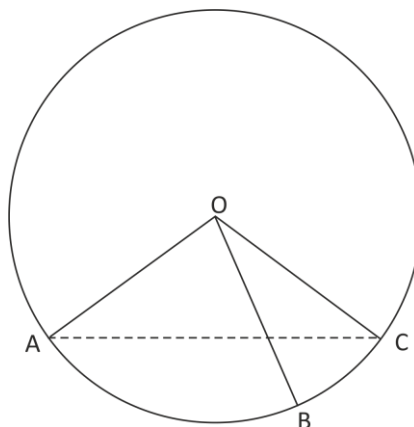


- (b) Mr. Mohan has ₹ 256 in the form of ₹1 and ₹ 2 coins. If the number of ₹ 2 coins are three more than twice the number of ₹ 1 coins, find the total value of ₹ 2 coins. [3]
- (c) Find: [4]
- (i) Mean and
 - (ii) Median
- for the following observations:

10, 47, 3, 9, 17, 27, 4, 48, 12, 15

Question 9

- (a) Three cubes are kept adjacently, edge to edge. If the edge of each cube is 7 cm, find total surface area of the resulting cuboid. [3]
- (b) In the given figure, arc AB = twice arc BC and $\angle AOB = 80^\circ$. Find: [3]
- (i) $\angle BOC$
 - (ii) $\angle OAC$



- (c) Solve graphically the following system of linear equations (use graph sheet): [4]

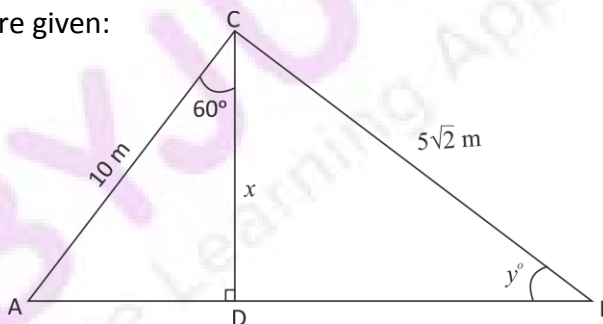
$$x - 3y = 3$$

$$2x + 3y = 6$$

Also, find the area of the triangle formed by these two lines and the y-axis.

Question 10

- (a) Each interior angle of a regular polygon is 135° . Find: [3]
- the measure of each exterior angle.
 - number of sides of the polygon.
 - name the polygon.
- (b) If $\log 4 = 0.6020$, find the value of $\log 80$. [3]
- (c) Evaluate x and y from the figure given: [4]



Question 11.

- (a) $\triangle ABC$ is an isosceles triangle such that $AB = AC$. D is a point on side AB such that $BC = CD$. Given $\angle BAC = 28^\circ$. Find the value of $\angle DCA$. [3]
- (b) Prove that opposite angles of a parallelogram are equal. [3]
- (c) The cross-section of a 6 m long piece of metal is shown in the figure. Calculate: [4]
- the area of the cross-section
 - The volume of the piece of metal in cubic centimetres.

