

Marks

11. Frequency distribution table of the marks obtained in mathematics of students of a class are provided :

Class Interval	46—50	51—55	56—60	61—65	66—70	71—75	76—80
Frequency	8	13	15	20	12	7	5

- (a) Find $f_1 + f_2$, where the symbols indicates usual meaning. 2
- (b) Determine the mean of given data by short-cut method. 4
- (c) Draw the ogive curve of given data with description. 4



01 Set

MATHEMATICS (CREATIVE)

[According to the Syllabus of 2025]

Subject Code :

1	0	9
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Time—2 hours and 30 minutes

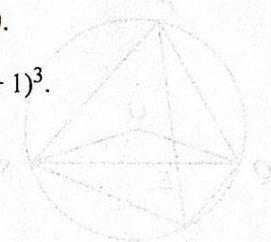
Full marks—70

- [N.B. The figures in the right margin indicate full marks. Answer seven questions in total taking two from Group A (Algebra), two from Group B (Geometry), two from Group C (Trigonometry and Mensuration) and one from Group D (Statistics).]

Group A—Algebra

Marks

1. (i) $f(x) = \frac{3x-4}{5x-8}$ is a function. 2
- (ii) $S = \{(x, y) : x \in A, y \in A \text{ and } y - x = 1\}$,
where $A = \{-2, -1, 0, 1, 2, 3\}$. 2
- (a) Find the value of $f(-3)$. 2
- (b) Find the value of $\frac{f\left(\frac{1}{x^2}\right) - 1}{f\left(\frac{1}{x^2}\right) + 1}$. 4
- (c) By expressing the relation S in tabular method, find its range. 4
2. $x^2 = 11 + 2\sqrt{30}$ and $y^2 + \frac{1}{y^2} = 38, y > 0$. 2
- (a) Resolve into factors : $a^3 - 9 + (a+1)^3$. 2
- (b) Prove that, $x^3 + \frac{1}{x^3} = 42\sqrt{6}$. 4
- (c) Find the value of $y^5 - \frac{1}{y^5}$. 4
3. (i) The 12th term of any arithmetic series is 28 and 18th term is 58. 2
- (ii) The 5th term of a geometric series is $\frac{1}{32}$ and 8th term is $\frac{1}{256}$. 2
- (a) Find which term of the series $5 + 9 + 13 + 17 + \dots$ is 353. 2
- (b) Find the sum of first 15 terms of the arithmetic series. 4
- (c) Find the geometric series. 4

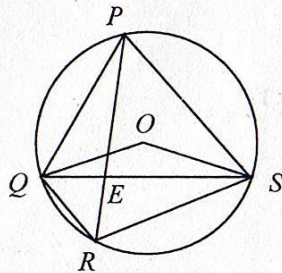


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Group B—Geometry

Marks

4. M is the middle point of the side QR of the triangle PQR . The bisectors of $\angle Q$ and $\angle R$ meet at the point O .
- (a) Prove that, the exterior angle so formed by producing a side of a triangle is equal to the sum of the interior opposite angles. 2
- (b) Show that, $PQ + PR > 2PM$. 4
- (c) Prove that, $\angle QOR = 90^\circ + \frac{1}{2} \angle P$. 4
5. The lengths of two diagonals of a parallelogram are $p = 4\text{cm}$ and $q = 6.5\text{cm}$ and the included angle is 45° .
- (a) Construct a square whose one side is 3.5cm (The sign of the construction is must) 2
- (b) Construct the parallelogram. (The sign and the description of the construction are must). 4
- (c) Draw the circumcircle of the equilateral triangle whose one side is ' p '. (The sign and the description of the construction are must) 4
6. In the figure, O is the centre of the circle and two chords PR and QS intersect each other at the point E .



- (a) Prove that, the angle inscribed in the semi-circle is a right angle. 2
- (b) Prove that, $\angle QPS = \frac{1}{2} \angle QOS$. 4
- (c) By joining P, O and R, O prove that, $\angle POQ + \angle ROS = 2\angle PEQ$. 4

Group C—Trigonometry and Mensuration

Marks

7. In $\triangle ABC$, $\angle A$ is a right angle, $\sin B = \frac{1}{2}$ and $(\cos \theta + 5) \cos \theta - \sin^2 \theta = P$.
- (a) Prove that, $\cot A \sqrt{1 - \cos^2 A} = \cos A$. 2
- (b) By using the stem, prove that, $\frac{1}{2 - \sin^2 C} + \frac{1}{2 + \tan^2 C} = 1$. 4
- (c) If $P = 2$ then solve the equation; where θ is an acute angle. 4
8. (i) The depression of a point on the ground 15 metres from the top of the house is 60° .
- (ii) A tree is broken by a storm such that the undetached broken part makes an angle of 30° with the other and touches the ground at a distance of 11 metres from its foot.
- (a) Find the value of $\frac{1 - \tan^2 30^\circ}{1 + \tan^2 30^\circ}$. 2
- (b) Find the height of the house. 4
- (c) Find the length of the whole tree. 4

The length and the breadth of a rectangular region are 16m and 12m respectively. There is a circular region around the rectangular region.

- (a) The length of a side of an equilateral triangle is 9cm, then find its area. 2
- (b) Determine the circumference of the circular region. 4
- (c) Determine the ratio of the area of whole surface of the solid that is formed by revolving the rectangle around its greater side and the area of the rectangular region. 4

Group D—Statistics

10. Observe the following distribution table :

Class Interval	31—40	41—50	51—60	61—70	71—80	81—90
Frequency	4	6	9	11	7	3

- (a) Determine the mid-value of mode class. 2
- (b) Determine the median from the given distribution table. 4
- (c) Draw the frequency polygon of given data with description. 4

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