Series MAT/10/01

Set ~ 1

Q.P Code 10/01/01

Roll No. | | | | | | | |

Candidates must write the Q.P Code on the title page of the answer-book.

- Please check that this question paper contains **9** printed pages.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 38 questions.
- **Please write down the serial number of the question in the answer-book before attempting it.**
- 15 Minute time has been allotted to read this question paper. The question paper will be distributed at 10:15 a.m From 10.15a.m to 10.30 a.m, the students will read the question paper only and will not write any answer on the answer –book during this period

MATHEMATICS

Time Allowed : 3 hours **Maximum Marks : 80**

General Instructions:

1.This Question Paper has 5 Sections A, B, C, D, and E with internal choice.

2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.

3. Section B has 5 Short Answer - I (SA - I) type questions carrying 2 marks each.

4. Section C has 6 Short Answer - II (SA - II) type questions carrying 3 marks each

5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.

6. Section E has 3 sourced based/Case Based/passage based/integrated units of assessment (4 marks each) with sub - parts of the values of 1, 1 and 2 marks each respectively.

7.All Questions are compulsory.

ARTHAM RESOURCES

HALF YEARLY PAPER 2024-25
CLASS 10 MATHEMATICS

Section A

(20 Marks)

1 The HCF of 867 and 255 is

a) 51

b) 35

c) 25

d) 55

2 2.35 is

a) an integer

b) a rational number

c) an irrational number

d) a natural number

3 Which of the following is a quadratic polynomial with zeroes $\frac{5}{3}$ and 0?

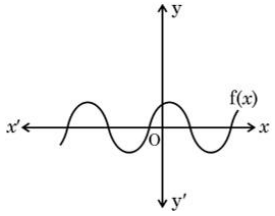
a) $3x(x - 5)$

b) $\frac{5}{3}x^2$

c) $x^2 - \frac{5}{3}$

d) $3x(3x - 5)$

4 The graph of y = f(x) is shown in the figure for some polynomial f(x).



P.T.O.

The number of zeroes of f(x) is

a) 4

b) 8

c) 6

d) 5

5 If am = bl and bn≠ cm, then the system of equations

ax + by = c

Ix + my = n

a) Has a unique solution.

b) Has infinitely many solutions.

c) Has no solution.

d) May or may not have a solution.

6 The lines represented by 3x + y – 12 = 0 and x – 3y + 6 = 0 intersects the y – axis at

a) (0, – 2) and (0, 12)

b) (0, 2) and (0, – 12)

c) (0, – 2) and (0, – 12)

d) (0, 2) and (0, 12)

7 For what value of k, do the equations kx - 2y = 3 and 3x + y = 5 represent two lines intersecting at a unique point?

a) all real values except - 6

b) k = 3

c) k = 6

8 Determine the value of k for which the quadratic equation $2x^2 + 3x + k = 0$ has real roots.

a) $k \geq \frac{9}{8}$

b) $k \leq \frac{8}{9}$

c) $k \leq \frac{9}{8}$

d) $K = \frac{8}{9}$

9 The value(s) of k for which the roots of quadratic equation $x^2 + 4x + k = 0$ are real, is

a) $k \geq -4$

b) $k \leq 4$

c) $k \leq -4$

d) $k \geq 4$

10 A quadratic equation $ax^2 + bx + c = 0$, has coincident roots, if

a) $b^2 - ac = 0$

b) $b^2 - 4ac < 0$

c) $b^2 - 4ac > 0$

d) $b^2 - 4ac = 0$

11 Which term of the A.P. 21, 18, 15, ……..is - 81?

a) 24

b) 30

c) 36

d) 35

12 The seventh term of an A.P. whose first term is 28 and common difference - 4, is

a) 56

b) 0

c) 52

d) 4

13 Two persons Harsh and pankaj joined D.W. Associates. Harsh and Pankaj started with an initial salary of₹ 50000 and ₹ 64000 respectivelywith annual increment of ₹ 2500 and ₹ 2000 each respectively. In which year will Harsh start earning more salary than Pankaj?

a) 28^{th}

b) 27^{th}

c) 30^{th}

d) 29^{th}

14 Δ PQR $\sim$ Δ XYZand the perimeters of Δ PQRand Δ XYZare 30 cm and 18 cm respectively. If QR = 9 cm, then, YZ is equal to

a) 4.5 cm.

b) 5.4 cm.

c) 12.5 cm.

d) 9.5 cm.

15 If the bisector of an angle of a triangle bisects the opposite side then the triangle is

a) scalene

b) isosceles

c) equilateral

d) right - angled

16 Match the following.

Column - I	Column - ll
(a) In $\triangle$ ABC and $\triangle$ PQR $\frac{AB}{PQ} = \frac{AC}{PR}$, $\angle$ A = $\angle$ P $\Rightarrow$ $\triangle$ ABC $\sim$ $\triangle$ PQR	(i) AA similarity criterion
(b) In $\triangle$ ABC and $\triangle$ PQR $\angle$ A = $\angle$ P, $\angle$ B = $\angle$ Q $\Rightarrow$ $\triangle$ ABC $\sim$ $\triangle$ PQR	(ii) SAS similarity criterion
(c) In $\triangle$ ABC and $\triangle$ PQR $\frac{AB}{PO} = \frac{AC}{PR} = \frac{BC}{PR} \Rightarrow$ $\triangle$ ABC $\sim$ $\triangle$ PQR	(iii) SSS similarity criterion
(d) In $\triangle$ ABC, DE || BC $\Rightarrow$ $\frac{AD}{BD} = \frac{AE}{EC}$	(iv) BPT

a) (a) - (iv), (b) - (ii), (c) - (i), (d) - (iii)

b) (a) - (ii), (b) - (i), (c) - (iii), (d) - (iv)

c) (a) - (iii), (b) - (i), (c) - (iv), (d) - (ii)

d) (a) - (i), (b) - (ii), (c) - (iii), (d) - (iv)

17 **Assertion (A):** H.C.F. of 12 and 77 is 1.

Reason (R): L.C.M. of two coprime numbers is equal to their product.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

18 **Assertion (A):** Line represented by 2x + 2y = 0 and x + y = 0 do have non - zero solutions.

Reason (R): Two lines represented by ax + by = 0 and px + qy = 0 always has non - zero solutions.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

19 **Assertion (A):** $4x^2 - 12x + 9 = 0$has repeated roots.

Reason (R): The quadratic equation $ax^2 + bx + c = 0$have repeated roots if discriminant D > 0.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

20 **Assertion (A):** If two triangles are similar then they are congruent also.

Reason (R): Ratio of perimeters of two triangles is always equal to ratio of their corresponding sides, medians, altitudes and angle bisectors.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

Section B

(10 Marks)

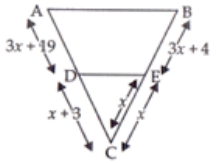
21 If d = HCF(48, 72), find the value of d.

22 Find the LCM and HCF of thepairs of integers 336and 54 and verify that LCM× HCF = product of the two numbers.

23 Write the zeros of the quadratic polynomial f(x) =$4\sqrt{3}x^2 + 5x - 2\sqrt{3}$

24 Find the values of k so that the quadratic equation $x^2 - 4kx + k = 0$ has equal roots.

25 Find the value of x for which DE‖ AB in the given figure.



Section C

(18 Marks)

26 Prove that $\frac{1}{\sqrt{3}}$ is irrational.

OR

Renu has collected 8 U.S. stamps and 12 international stamps. She wants to display them in identical groups of U.S. and international stamps, with no stamps left over. What is the greatest number of groups Renu can display them in?

27 Find a quadratic polynomial whose sum and product of the zeroes are $\frac{-3}{2\sqrt{5}}, -\frac{1}{2}$ respectively.Also find the zeroes of thepolynomialby factorisation.

28 Solve the system of linear equations by using the method of elimination by equating the co - efficients:

8x + 5y = 9

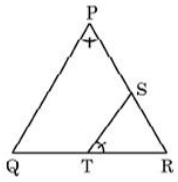
3x + 2y = 4

29 Solve the quadratic equation by factorization:

$$\frac{x+1}{x-1} + \frac{x-2}{x+2} = 4 - \frac{2x+3}{x-2}$$

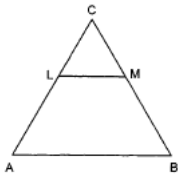
30 If S_n denotes, the sum of the first n terms of an A.P. prove that $S_{12} = 3(S_8 - S_4)$.

31 S and T are points on sides PR and QR of$\triangle$ PQR such that $\angle P = \angle RTS$. Show that $\triangle RPQ \sim \triangle RTS$.



OR

In Fig.$LM \parallel AB$. If AL = x - 3, AC = 2x, BM = x -2 and BC = 2x + 3, find the value of x.



Section D

(20 Marks)

32 Prove that $\frac{2+\sqrt{3}}{5}$ is irrational.

33 Find the zeroes of a quadratic polynomial $2x^2 + 3x - 14$ and verify the relationship between the zeroes and its coefficients.

OR

If β and $\frac{1}{\beta}$ are zeroes of the polynomial $(\alpha^2 + \alpha)x^2 + 61x + 6\alpha$. Find the values of β and α.

34 Solve the pair of linear equations $\frac{3x}{2} - \frac{5y}{3} = -2$ and $\frac{x}{3} + \frac{y}{2} = \frac{13}{6}$ by substitution method.

35 If 8th term of an A.P. is half of its second term and 11th term exceeds one third of its fourth term by 1. Find the 15th term.

Section E

(12 Marks)

36 **Read the text carefully and answer the questions:**

February 14 is celebrated as International Book Giving Day and many countries in the world celebrate this day. Some people in India also started celebrating this day and donated the following number of books of various subjects to a public library:

History = 96, Science = 240, Mathematics = 336.

These books have to be arranged in minimum number of stacks such that each stack contains books of only one subject and the number of books on each stack is the same.

1. How many books are arranged in each stack?
2. How many stacks are used to arrange all the Mathematics books?
3. Determine the total number of stacks that will be used for arranging all the books.

OR

If the thickness of each book of History, Science and Mathematics is 1.8 cm, 2.2 cm and 2.5 cm respectively, then find the height of each stack of History, Science and Mathematics books.

37 **Read the text carefully and answer the questions:**

Two schools **P** and **Q** decided to award prizes to their students for two games of Hockey ₹ x per student and Cricket ₹ y per student. School **P** decided to award a total of ₹ 9,500 for the two games to 5 and 4 students respectively; while school **Q** decided to award ₹ 7,370 for the two games to 4 and 3 students respectively.

1. Represent the following information algebraically (in terms of x and y).
2. What is the prize amount for hockey?
3. Prize amount on which game is more and by how much?

OR

What will be the total prize amount if there are 2 students each from two games?

38 **Read the text carefully and answer the questions:**

The tradition of pottery making in India is very old. In fact, it is older than Indus Valley Civilization. The shaping and baking of clay articles has continued through the ages. The picture of a potter is shown below:

A potter makes a certain number of pottery articles in a day. It was observed on a particular day the cost of production of each article(in ₹) was one more than twice the number of articles produced on that day. The total cost of production on that day was ₹ 210.

1. Taking number of articles produced on that day as x, form a quadratic equation in x.
2. Find the number of articles produced and the cost of each article.
3. Find the cost of production of 15 articles.

OR

Find the numberof articles made by Potter in a day if the total cost of production is₹ 1575.