

## SEMESTER-TWO

## MATHEMATICS

Grade-10

### Sample Paper-1

**Max. Marks: 50**

**Time Allowed: 90 minutes**

#### **General Instructions:**

- (i) This question paper consists of 45 questions in 5 sections.
- (ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
- (iii) Section A consists of 10 Multiple Choice Questions carrying 1 mark each.
- (iv) Section B consists of 10 Fill in the Blank Type Questions carrying 1 mark each.
- (v) Section C consists of 10 True or False Type Questions carrying 1 mark each.
- (vi) Section D consists of 10 Very Short Answer Questions carrying 1 mark each.
- (vii) Section E consists of 5 Short Answer Questions carrying 2 marks each.

#### **Section A**

*Select and write one most appropriate option out of the four options given for each of the questions 1 – 10.*

- 1.** The value of  $x$  which satisfies the linear inequality  $4x + 3 < 6x + 7$  is  
(a)  $x < -2$       (b)  $x > -2$       (c)  $x < 2$       (d)  $x > 2$
- 2.** The solution set of the linear inequality  $5x + 8 < 23$ ;  $x$  is a whole number is  
(a)  $\{1, 2\}$       (b)  $\{0, 1\}$       (c)  $\{0, 2\}$       (d)  $\{0, 1, 2\}$

- 3.** What is the image of in the mapping  $x \rightarrow 3x + 7$   
 (a) 24 (b) 10 (c) 16 (d) 13
- 4.** The gradient of the line of equation  $7x - 5y + 8 = 0$  is  
 (a)  $\frac{7}{5}$  (b)  $-\frac{7}{5}$  (c)  $\frac{5}{7}$  (d)  $-\frac{5}{7}$
- 5.** If  $2x + 3y = 13$  and  $5x - 4y = -2$ , then  $x + y$  equals  
 (a) 6 (b) -6 (c) 5 (d) -5
- 6.** The system of a pair of simultaneous linear equations  $x = 0, y = 3$  has  
 (a) no solution (b) a unique solution  
 (c) two solutions (d) infinitely many solutions
- 7.** If P(2, 5) and Q(-2, 3) are points in the cartesian plain, find the vector  $\vec{PQ}$ .  
 (a)  $\begin{pmatrix} 4 \\ -2 \end{pmatrix}$  (b)  $\begin{pmatrix} -4 \\ -2 \end{pmatrix}$  (c)  $\begin{pmatrix} -4 \\ 2 \end{pmatrix}$  (d)  $\begin{pmatrix} 4 \\ 2 \end{pmatrix}$
- 8.** If  $\mathbf{u} = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$  and  $\mathbf{v} = \begin{pmatrix} 4 \\ -2 \end{pmatrix}$ , find  $2\mathbf{u} + 3\mathbf{v}$ .  
 (a)  $\begin{pmatrix} 11 \\ 5 \end{pmatrix}$  (b)  $\begin{pmatrix} 11 \\ 13 \end{pmatrix}$  (c)  $\begin{pmatrix} 5 \\ 1 \end{pmatrix}$  (d)  $\begin{pmatrix} 14 \\ 0 \end{pmatrix}$
- 9.** How many lines of symmetry does a rectangle have?  
 (a) 1 (b) 2 (c) 3 (d) 4
- 10.** The mean of the numbers 4, 3, 3,  $x$  is 5. Find  $x$ .  
 (a) 20 (b) 10 (c) 5 (d) 4

### Section B

Fill in the blanks with a suitable word for each of the questions 11 – 20.

- 11.** If  $3x + 7 = 22$ , then  $x$  is .....
- 12.** If  $-5 < 9 - 2x$ , then  $x =$  .....
- 13.** If  $(x, 7) = (4, 7)$  the value of  $x$  is .....
- 14.** Fill the relation:  
 Monrovia ..... Liberia.

15. A ..... is a vector which begins and ends at the same point.
16. If any two vectors have the same components, then they are .....
17. Reflection in the line  $x = k$  or  $x - k = 0$ , the mapping is .....
18. An isosceles triangle has number of line(s) of symmetry .....
19. .... is the data collected directly from the source.
20. Mean =  $\frac{\text{Sum of observations}}{\text{.....}}$

### Section C

*State whether the following statements are true or false for each of the questions 21–30.*

21. Two equations that have the same solution are called equivalent equations.
22. The equation  $4x - 7 = 9$  is true for  $x = 3$ .
23. The range is a subset of the co-domain.
24. For every element of the domain, there is exactly two images in the co-domain.
25. A position is a vector which begins from the origin and ends at a point.
26. The length of the vector  $\overrightarrow{AB} = \begin{pmatrix} -5 \\ 10 \end{pmatrix}$  is  $25\sqrt{5}$  units.
27. If  $\mathbf{r} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$  and  $\mathbf{s} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$ , then  $\mathbf{r} + \mathbf{s} = \begin{pmatrix} 4 \\ 6 \end{pmatrix}$ .
28. Reflection conserves angles, lengths and area but cannot reverse the figure.
29. Mode is always one of the given observations.
30. A plot where each data value is split into a 'leaf' and a 'stem' is called a stem and leaf plot.

## Section D

Answer each of the questions 31 – 40.

31. Solve for  $x$ :  $\frac{1+2x}{5} = 7$ .

32. Solve the equation and check your solution:

$$\frac{2x-3}{6} - \frac{x-5}{2} = \frac{x}{6}$$

33. Find the rule for the following mapping:

$$\{(2, 18), (3, 25), (4, 32), (5, 39)\}$$

34. A function  $f : x \rightarrow ax + b$  is such that  $f(1) = 9$  and  $f(2) = 14$ . Find  $f(0)$ .

35. Consider the following simultaneous linear equations and find their common set of truth values.

$$2x - y = 2; \quad 4x + 3y = 24$$

36. If  $\mathbf{a} = \begin{pmatrix} 5-x \\ y+3 \end{pmatrix}$  and  $\mathbf{b} = \begin{pmatrix} -2 \\ -6 \end{pmatrix}$ , find  $x$  and  $y$  when  $\mathbf{a} = \mathbf{b}$ .

37. Find the image of the point  $P(-1, -2)$

38. Find the mode of the given set of numbers:

$$1, 1, 2, 4, 3, 2, 1, 2, 2, 4.$$

39. Find the median of the following data:

$$5, 9, 6, 4, 8, 2, 7$$

40. What is the average formula?

## Section E

Answer each of the questions 41 – 45.

41. Two numbers are in the ratio 1 : 2. When 4 is added to each, the ratio becomes 2 : 3. Find the numbers.

42.  $Q'$  is the image of  $Q(2, 1)$  under a translation which maps  $P(3, 4)$  onto  $P'(7, 6)$ . Find the coordinates of  $Q'$ .

**43.** The sum of two numbers is 29. Their difference is 17. Find the two numbers.

**44.** Find the value of  $x$  which makes the following relations not defined

$$x \rightarrow \frac{1}{4x^2 - 4x + 1}.$$

**45.** Solve the following inequalities and represent the solution on the

number line:  $\frac{2x - 1}{3} \geq \frac{3x - 2}{4} - \frac{2 - x}{5}.$