

# **Directorate of Education, GNCT of Delhi**

## **Mid-term Practice Paper (Session: 2025-26)**

**Class – X**

**Subject – Mathematics**

**Duration: 3 hours**

**Max. Marks: 80**

### **General Instructions:**

1. This Question Paper has 5 Sections 'A', 'B', 'C', 'D' and 'E'.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based questions (04 marks each) with sub parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Questions of 5 marks, 2 Questions of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E. You have to attempt only one option out of these given options.
8. Draw neat figures wherever required.
9. Take  $\pi = \frac{22}{7}$  wherever required, if not stated.
10. There is no provision of negative marking.
11. Use of calculator is not permitted.

Please do write down the Serial Number of the question before attempting it.

### **SECTION A**

***Section A consists of twenty questions of 1 mark each.***

1. The diameter of a circle is of length 6 cm. If one end of the diameter is (-4, 0), the other end on x-axis is at:  
(a) (4, 0) (b) (2, 0) (c) (-4, 0) (d) (-2, 0)
2. The probability of happening of an event is  $\frac{11}{24}$ . The probability of not happening of that event is :  
(a)  $\frac{11}{13}$  (b)  $\frac{13}{11}$  (c)  $\frac{7}{12}$  (d)  $\frac{13}{24}$
3. The common difference of an AP -1, -1, -1, -1, -1, -1, ..... is:  
(a) -1 (b) 1 (c) 2 (d) 0
4. The value of  $\frac{\cot 45^\circ}{\sin 30^\circ + \cos 60^\circ}$  is :  
(a) 1 (b)  $\frac{\sqrt{3}}{2}$  (c) 2 (d)  $\frac{1}{2}$
5. The relation between x and y so that the point (x,y) is equidistant from the points (-4,-4) and (-2,4) is:  
(a)  $x-4y+3=0$  (b)  $x-4y-3=0$  (c)  $x+4y-3=0$  (d)  $x+4y+3=0$
6. The term equal to 0 for AP 27, 24, 21, ..... is :  
(a) 10 (b) 9 (c) 27 (d) 3
7. The prime factorization of 536 is:  
(a)  $2 \times 3 \times 3 \times 13$  (b)  $2 \times 3 \times 7 \times 13$   
(c)  $2 \times 7 \times 13$  (d)  $2 \times 2 \times 2 \times 13$

8. If  $\Delta XZY \sim \Delta CBA$  and  $\frac{XZ}{CA} = \frac{2}{3}$ , then the ratio of their corresponding altitudes drawn from X and C to their opposite sides is:  
 (a)  $\frac{3}{2}$  (b)  $\frac{4}{9}$  (c)  $\frac{1}{3}$  (d)  $\frac{2}{3}$
9. One card is drawn from a well-shuffled deck of 52 cards. The probability that the card will not be a face card is:  
 (a)  $\frac{11}{52}$  (b)  $\frac{5}{13}$  (c)  $\frac{10}{13}$  (d)  $\frac{9}{13}$
10. The value of p for which the system of equations  $6x - 3y + 12 = 0$  and  $2x + py = -4$  has many solution is:  
 (a) -1 (b) 1 (c) -3 (d) 3
11. The probability of choosing a vowel from the word EXCOMMUNICATION is:  
 (a)  $\frac{2}{5}$  (b)  $\frac{1}{3}$  (c)  $\frac{8}{15}$  (d)  $\frac{7}{15}$
12. The mid-point of the line segment joining the points (6,-3) and (-14,11) is:  
 (a) (-8,7) (b) (8,8) (c) (4,8) (d) (-4,4)
13. If  $\Delta BAC \sim \Delta DEF$  and  $\angle A = 45^\circ$ ,  $\angle D = 55^\circ$ , then the value of  $\angle E$  is:  
 (a)  $45^\circ$  (b)  $75^\circ$  (c)  $55^\circ$  (d)  $80^\circ$
14. A surveyor is standing at a distance of 40 m from the base of a tower BC. To find the height of the tower he measures  $\angle A$  as  $\tan A = \frac{3}{4}$ . The height of the tower is:  
 (a) 20 m (b) 10 m (c) 30 m (d) 40 m
15. The ratio in which the point P(t,-2) divides the line segment joining the points D(-4,3) and C(2,-4) is:  
 (a) 5:2 (b) 1:2 (c) 2:5 (d) 2:1
16. Three coins are tossed simultaneously. The probability of getting all heads is:  
 (a)  $\frac{1}{8}$  (b)  $\frac{3}{8}$  (c)  $\frac{3}{2}$  (d)  $\frac{1}{2}$
17. If  $\sin \theta = \frac{1}{3}$ , then  $4\sec \theta$  is equal to :  
 (a)  $\frac{2\sqrt{2}}{3}$  (b)  $2\sqrt{3}$  (c)  $3\sqrt{2}$  (d)  $\frac{1}{\sqrt{2}}$
18. The probability of getting a pair of prime numbers on throwing two die together is:  
 (a)  $\frac{1}{4}$  (b)  $\frac{4}{9}$  (c)  $\frac{1}{2}$  (d)  $\frac{1}{6}$

**Directions for Q 19 & 20 :** There is one Assertion (A) and one Reason (R). Choose the correct answer of these questions from the four options (a),(b),(c) and (d) given below :

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the assertion (A).  
 (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of the assertion (A).  
 (c) Assertion (A) is true but reason (R) is false.  
 (d) Assertion (A) is false but reason (R) is true.
19. Assertion (A) : The pair of equations  $3x^2 - y + 1 = 0$  and  $6x^2 - 2y - 2 = 0$  has a unique solution.  
 Reason (R) : The above equations represent parallel lines.

20. Assertion (A) : The ratio of the length of a vertical pole and the length of its shadow is  $\sqrt{3}:1$ , then at that moment the angle of depression of the shadow is  $60^\circ$ .  
Reason (R) : The alternate interior angles formed between two parallels are equal.

### SECTION –B

*Section B consists of five questions of 2 marks each.*

21. If the first term of an AP is 12, the last term is 62 and the sum of first  $n$  terms is 147, then find the value of  $n$ .  
OR  
In an AP, if  $S_n = n(2n-1)$  then find first five terms of AP.
22. Find the value of  $m$  for which the following pair of linear equations has a unique solution:  

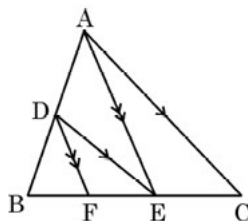
$$x + 2y - 5 = 0$$

$$2x - my + 6 = 0$$
23. A bag contains 4 green, 5 blue and some black balls. If probability of drawing a green ball at random is  $\frac{1}{5}$ , then find the probability of drawing a black ball at random.
24. The LCM of two numbers is 14 times their HCF. The sum of LCM and HCF is 600. If one of the number is 280. Find the other number.  
OR  
During a sale, colour pencils were being sold in the pack of 24 each and crayons in the pack of 32 each. If you want full packs of both and the same number of pencils and crayons, how many packets of each would you need to buy?
25. How many terms of the AP: 24 , 21 , 18..... must be taken so that their sum is 78?

### SECTION – C

*Section C consists of six questions of 3 marks each.*

26. Prove that  $\sqrt{7}$  is an irrational number.
27. The angle of elevation of the top of a building from the foot of the tower is  $30^\circ$  and the angle of elevation of the top of the tower from the foot of the building is  $60^\circ$ . If the tower is 50 m high, find the height of the building.
28. In the given figure,  $DE \parallel AC$  and  $DF \parallel AE$ . Prove that  $\frac{BF}{FE} = \frac{BE}{EC}$ .



OR

The diagonals of a quadrilateral ABCD intersect each other at the point O such that  $\frac{AO}{BO} = \frac{OC}{OD}$ .  
Show that quadrilateral ABCD is a rhombus.

29. Gunjan scored 40 marks in a test getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks were deducted for each wrong answer, then Gunjan again would have scored 40 marks. How many questions were there in the test?

30. Evaluate  $\frac{5 \cos^2 30^\circ + 4 \cot^2 45^\circ - \sec 60^\circ}{\operatorname{cosec} 30^\circ + \tan 60^\circ + \sin 30^\circ}$

OR

If  $x = a \sec \phi$  and  $y = b \tan \phi$  then show that  $b^2 x^2 - a^2 y^2 = a^2 b^2$

31. Name the quadrilateral formed by joining the points  $(-3, 2)$ ,  $(-5, -5)$ ,  $(2, -3)$  and  $(4, 4)$  taken in order.

### **SECTION – D**

*Section D consists of four questions of 5 marks each.*

32. State and prove Basic Proportionality Theorem.

33. Find the coordinates of the points that divide the line segment joining the points  $(-2, 2)$ , and  $(2, 8)$  into four equal parts.

OR

Points  $A(-1, y)$  and  $B(5, 7)$  lie on a circle with centre  $O(2, -3y)$ . Find the values of  $y$ . Hence find the radius of the circle.

34. Five times the numerator of a fraction is 4 more than its denominator. The sum of the numerator and denominator is 7. Find the fraction.

OR

Solve graphically:

$$8x + 5y = 9$$

$$3x + 2y = 4$$

Shade the region formed between x-axis, y-axis and these lines.

35. Prove that:  $(\operatorname{cosec} A - \sin A)(\sec A - \cos A)(\tan A + \cot A) = 1$

### **SECTION – E**

*Section E has three case based questions of 4 marks each.*

36. The following figures show the relation between number of triangles formed by arranging number of matchsticks in a pattern.



Figure 1



Figure 2



Figure 3

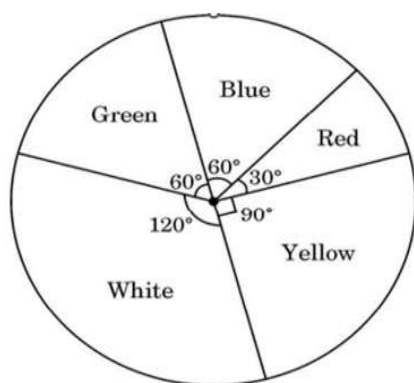
Observe the pattern and answer the questions below:

- |  |   |
|--|---|
| (i) Write an AP for the number of match-sticks used in the figure.   | 1 |
| (ii) Write the common difference for the number of triangles formed.   | 1 |
| (iii) Let $t$ be the number of triangles formed. Write an AP that shows the relation between triangles and number of matchsticks used in forming them. | 2 |

OR

Which figure has 75 matchsticks?

37. In a residential area, people painted their houses in different colours. The measure of each colour is shown by the central angle of a pie chart given below:



Based on the above information, answer the following questions:

- |   |   |
|---|---|
| (i) What is the probability of choosing a house white or yellow in colour?        | 1 |
| (ii) Find the probability of choosing a house green in colour?                    | 1 |
| (iii) 52 people painted their house red. Find total number of houses in the area. | 2 |

OR

Pair the colours that are exactly half of the number of houses.

38. Amanpreet is standing in between the two poles of equal heights, standing opposite each other on either side of a 100 m wide road. Amanpreet finds the angles of elevation of the top of the poles as  $30^\circ$  and  $60^\circ$ .

Based on the above information, answer the following questions:

- |  |   |
|--|---|
| (i) Draw a neat diagram for the given situation.                       | 1 |
| (ii) Find a relation between any pole and its distance from Amanpreet. | 1 |
| (iii) Find the height of the poles .                                   | 2 |

OR

How far is Amanpreet standing from the poles?