Roll No. _____ **NLCS/09/Maths/104**

Half Yearly Exam. 2024 – 2025

Time - 3:00 Hrs. **M.M. 80**

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D, and E.
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. However, an internal choice in 2 Qs of 2 marks, 2 Qs of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take π =22/7wwherever required if not stated.

Section – A Multiple Choice Questions :

Q.1 Which of the following is a rational number?

(a) π (b) $\sqrt{2}$ (c) $\frac{3}{4}$ (d) 0.123456789

Q.2 If $x+\frac{1}{x}=3$, what is the value of $x^2+\frac{1}{x^2}$?

(a) 5 (b) 7 (c) 9 (d) 11

Q.3 In a triangle ABC, if angle A = 60° and angle B = 80°, what is the measure of angle C?

(a) 40° (b) 50° (c) 60° (d) 70°

Q.4 The area of a rectangle is 48 sq cm. If the length is 6 cm, what is the breadth?

(a) 4 cm (b) 6 cm (c) 8 cm (d) 10 cm

Q.5 What is the value of $x \, if \; 2x+x-2=0$?

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{2}{3}$ (d) $\frac{3}{4}$

Q.6 If perimeter of trangle is 64 cm than semi perimeter?

(a) 28 (b) 30 (c) 32 (d) 34

Q.7 Simplify: $\frac{\left(3x^2+5x-2\right)}{\left(x+2\right)}$.

(a) 3x – 1 (b) 3x + 1 (c) 3x – 4 (d) 3x + 4

Q.8 Find the value of x in the equation: 2x + 5 = 11.

(a) 2 (b) 3 (c) 4 (d) 5

Q.9 Which of the following is an irrational number?

(a) $\frac{2}{3}$ (b) $\frac{3}{4}$ (c) $\sqrt{5}$ (d) 0.5

Q.10 If x + 1 is a factor of the polynomial $2x^2 + kx$, then k =

(a) –3 (b) 4 (c) –2 (d) 2

Q.11 In a triangle ABC, if angle A = 50° and angle B = 60°, what is the measure of angle C?

(a) 30° (b) 40° (c) 50° (d) 70°

Q.12 The perimeter of a triangle is 30 cm. If two sides are 10 cm and 12 cm, what is the third side?

(a) 5 cm (b) 6 cm (c) 8 cm (d) 10 cm

Q.13 The value of $2.\overline{45} + 0.\overline{36}$ is

(a) 31/11 (b) 24/11 (c) 67/33 (d) 167/110

Q.14 Side of ΔABC are 10cm, 8cm and 6cm find area.

(a) 40 sq cm (b) 48 sq cm (c) 56 sq cm (d) 64 sq cm

Q.15 The degree of zero polynomial is :

(a) 0 (b) any natural number (c) 1 (d) not defined

Q.16 Find the value of x in the equation $3x^2+7x+4=0$.

(a) 3 (b) 4 (c) 5 (d) 6

Q.17 Which of the following is have non terminating non perpeting decimal expression?

(a) π (b) $\frac{5}{7}$ (c) $\frac{3}{4}$ (d) $0.\overline{1234}$

Q.18 Side of equlateral Δ is 5 than area.

(a) $\frac{25\sqrt{3}}{4}$ (b) $\frac{9\sqrt{3}}{4}$ (c) $\frac{\sqrt{3}}{4}$ (d) $\frac{13\sqrt{3}}{4}$

For Questions number 19 & 20, two statements are given one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as 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.

Q.19 **Assertion (A) :** The side of a triangle are 3cm, 4cm, and 5 cm. Its area is 6cm^2.

Reason (R) : If 2s = (a + b + c), where a, b, c are the sides of a triangle,

then area = $\sqrt{(s-a)(s-b)(s-c)}$

Q.20 Assertion (A) : Two triangles are called adjacent if they have common vertex.

Reason (R) : The adjacent angles have common interior point.

Section – B Each question 2 marks.

Q.21 Factorise : $a^3 - 2\sqrt{2}b^3$

OR

Factorise : $x^4 + x^2y^2 + y^4$

Q.22 If $x+2$ is a factor of x^3+5x^2+6x+4, find the other factors.

Q.23 If two lines intersect, forming a pair of vertically opposite angles, prove that the angles are equal.

Q.24 In an isosceles triangle, if the vertex angle is 40°, find the base angles.

Q.25 Find the area of a triangle with sides 15, 20, and 25.

OR

What is the length of the altitude of an isosceles triangle with base 5 and sides 7?

Section – C Each question 3 marks.

Q.26 Show that 0.2247247… is a rational number.

OR

Show that 0.3353535… is a rational number.

Q.27 Factorize: (i) x^2+6x+8 (ii) $x^2+2x-35$

Q.28 Prove that the opposite angles of equal sides of a isosceles triangle are equal.

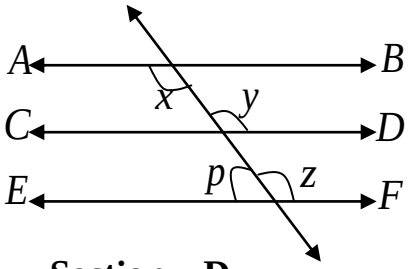
OR

Prove that the median of a triangle divides it into two triangles of equal area.

Q.29 Find the area of a equilateral triangle with side Y² by herons formula.

Q.30 Prove that the diagonals of a rectangle bisect each other.

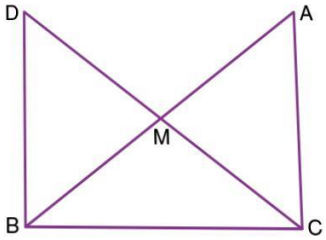
Q.31 In the fig. AB || CD and CD || EF.
Find the value of x, y , z and p



Section – D

Each question 5 marks.

Q.32 In right triangle ABC, right-angled at C, M is the mid-point of hypotenuse AB. C is joined to M and produced to a point D such that DM = CM. Point D is joined to point B (see the figure). Show that:

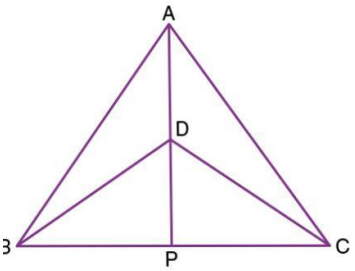


(i) ΔAMC ≅ ΔBMD (ii) ∠DBC is a right angle.

(iii) ΔDBC ≅ ΔACB (iv) CM = ½ AB

OR

ΔABC and ΔDBC are two isosceles triangles on the same base BC and vertices A and D are on the same side of BC (see the figure). If AD is extended to intersect BC at P, show that :



(i) ΔABD ≅ ΔACD

(ii) ΔABP ≅ ΔACP

(iii) AP bisects ∠A as well as ∠D.

(iv) AP is the perpendicular bisector of BC.

Q.33 Draw the graph of the linear equation 3x + 4y = 6. At what points, the graph cuts X and Y-axis?

OR

Show that the points A (1, 2), B (– 1, – 16) and C (0, – 7) lie on the graph of the linear equation y = 9x – 7.

Q.34 The perimeter of a triangular field is 240m with two sides 78m and 50m. Now, calculate the length of the altitude on the side of 50m length from its opposite vertex.

Q.35 Factorise : $x^3 + 13x^2 + 32x + 20$

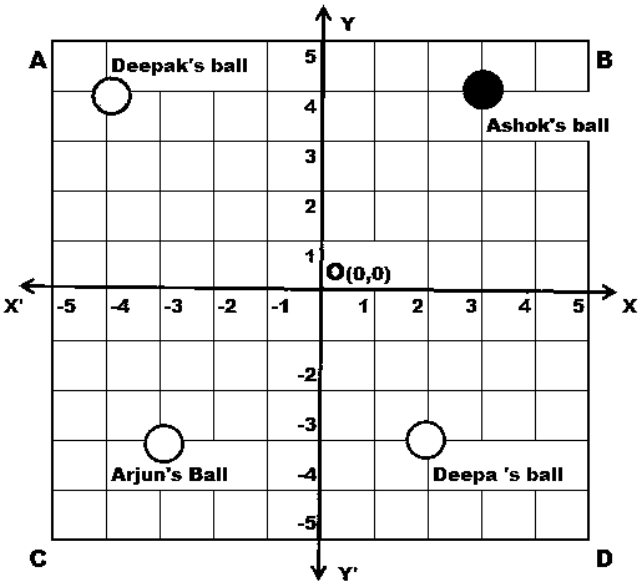
Section – E

Each case study base 4 marks.

Q.36 Read the Source/Text given below and answer any four questions:

There is a square park ABCD in the middle of Saket colony in Delhi. Four children Deepak, Ashok, Arjun and Deepa went to play with their balls. The colour of the ball of Ashok, Deepak, Arjun and Deepa are red, blue, yellow and green respectively.

All four children roll their ball from centre point O in the direction of XOY, X'OY, X'OY' and XOY'. Their balls stopped as shown in the above image.



Answer the following questions:

(i) What are the coordinates of the ball of Ashok?
(a) (4, 3) (b) (3, 4) (c) (4, 4) (d) (3, 3)

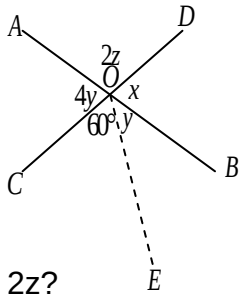
(ii) What are the coordinates of the ball of Deepa?
(a) (2, -3) (b) (3, 2) (c) (2, 3) (d) (2, 2)

(iii) What the line XOX' is called?
(a) y-axis (b) ordinate (c) x-axis (d) origin

OR

What the point O (0,0) is called?
(a) y-axis (b) ordinate (c) x-axis (d) origin

Q.37 Maths teacher draws a straight line AB shown on the blackboard as per the following figure. Now he told Raju to draw another line CD as in the figure. The teacher told Ajay to mark ∠AOD as 2z Suraj was told to mark ∠AOC as 4y Clive Made and angle ∠COE = 60° Peter marked ∠BOE and ∠BOD as y and x respectively



Now answer the following questions:

(i) What is the value of x?
(a) 48° (b) 96° (c) 100° (d) 120°

(ii) What is the value of y?
(a) 48° (b) 96° (c) 100° (d) 24°

(iii) What is the value of z? **OR** What should be the value of x + 2z?

Q.38 On one day, principal of a particular school visited the classroom. Class teacher was teaching the concept of polynomial to students. He was very much impressed by her way of teaching. To check, whether the students also understand the concept taught by her or not, he asked various

Questions to students. Some of them are given below. Answer them.

(i) Which one of the following is not a polynomial?

(a) $4x^2+2x-1$ (b) $y+\left(\frac{3}{y}\right)$ (c) x^3-1 (d) y^2+5y+1

(ii) The polynomial of the type ax^2+bx+c, $a=0$ is called :
(a) Linear polynomial (b) Quadratic polynomial
(c) Cubic polynomial (d) Biquadratic polynomial

(iii) The value of k, if (x – 1) is a factor of $4x^3+3x^2-4x+k$ is ------- .

OR

If x + 2 is the factor of x^3-ax^2+16, then value of a is -------- .

*****