PT4/ANNUAL EXAMINATION, 2023-24
MATHEMATICS

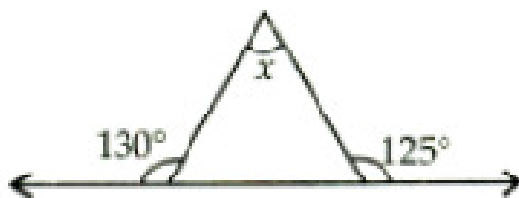**Time – 3 hrs.**   **Class – IX**   **M.M. – 80**

Name of the student _____ Section ____ Date - 16.02.2024 (Friday)

> **GENERAL INSTRUCTIONS -**
> - This Question Paper has 5 Sections A, B, C, D, and E.
> - Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
> - Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
> - Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.
> - Section D has 4 Long Answer (LA) type questions carrying 5 marks each.
> - 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.
> - All Questions are compulsory. However, an internal choice in 2 Questions of 2 marks, 2 Questions 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.
> - Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

SECTION-A

Q.1   For what value of m is $x^3 - 2mx^2 + 16$ is divisible by (x+2).   **1**

(a) 0   (b) 1   (c) -2   (d) 5

Q.2   If the coordinate of two points are P (-2, 3) and Q (-3,5), then Abscissa of P− Abscissa of Q is equal to.   **1**

(a) -1   (b) 1   (c) -5   (d) 5

Q.3   What is the solution of linear equation y = 2x if x = $1\frac{3}{2}$?   **1**

(a) 0   (b) 5   (c) 3   (d) 2

Q.4   The class mark of the class interval 100-150 is   **1**

(a) 50   (b) 100   (c) 250   (d) 125

Q.5   In triangle ABC, $\angle A = 30^0$, $\angle B = 40^0, \angle C = 110^0$ and if P, Q and R are the midpoints of AB, BC and CA respectively, then in triangle PQR   **1**

(a) $\angle P = 110^0, \angle Q = 40^0, \angle R = 30^0$ (b) $\angle P = 30^0, \angle Q = 40^0, \angle R = 110^0$

(c) $\angle P = 50^0, \angle Q = 40^0, \angle R = 90^0$ (d) $\angle P = 110^0, \angle Q = 30^0, \angle R = 40^0$

Q.6   Find the value of x **1**

(a) 70^0 (b) 75^0 (c) 60^0 (d) 65^0

Q.7   How many lines can pass through a given point?   **1**

(a) one   (b) two   (c) zero   (d) infinite

Q.8 Class mark of a particular class is 10.5 and class size is 7 then, the class interval of the class is   1

(a) 7 – 14   (b) 14 – 7   (c) 10.5 – 7   (d) 3.5 – 17.5

Q.9 An angle is 18° less than its complementary angle. The measure of this angle is   1

(a) 36^0 (b) 48^0 (c) 83^0 (d) 81^0

Q.10 When five times the larger of the two numbers is divided by the smaller, the quotient and remainder are 2 and 9, respectively. What is the linear equation in two variables for above statement?   1

(a) $x + y = 18$ (b) $5x = 2y + 9$ (c) $2y = 5x + 9$ (d) $5x + 2y = 9$

Q.11 If two interior angles on the same side of a transversal intersecting two parallel lines are in the ratio 5: 4, then the greater of the two angles is   1

(a) 56^0 (b) 48^0 (c) 100^0 (d) 81^0

Q.12 The value of 117×83 is   1

(a) 9711   (b) 9712   (c) 10200   (d) 9081

Q.13 In ΔABC, $A : B : C = 1: 2: 3$, then angle at B is   1

(a) 54^0 (b) 60^0 (c) 64^0 (d) 120^0

Q.14 In the given figure, O is the centre of the circle with chords AP and BP being produced to R and Q respectively. If ∠QPR = 35°, find the measure of ∠AOB.   1
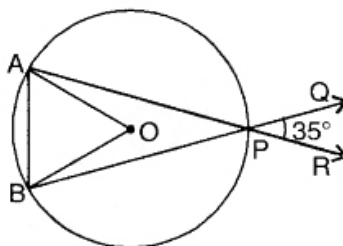
(a) 50^0 (b) 100^0 (c) 70^0 (d) 30^0

Q.15 Angle in a semicircle is equal to   1

(a) 100^0 (b) 90^0 (c) 180^0 (d) 0^0

Q.16 The ratio of the total surface area of a sphere and a solid hemi sphere of same radius will be   1

(a) 4:3   (b) 1:1   (c) 1:4   (d) 3:2

Q.17 If the sides of a triangle are 6cm , 8cm, and 10cm, then calculate its area   1

(a) $60cm^2$ (b) $24cm^2$ (c) $80cm^2$ (d) $480cm^2$

Q.18 ABCD is a rectangle with $\angle BAC = 42^0$, then $\angle DBC$ is equal to   1

(a) 50^0 (b) 100^0 (c) 48^0 (d) 30^0

Q.19 **Assertion (A) :** The degree of the polynomial $(x^2 – 2)(x – 3)(x + 4)$ is 3.   1

Reason (R) : A polynomial of degree 3 is called a cubic polynomial.

(a) Both assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of assertion (A)

(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A)

(c) Assertion (A) is true but Reason (R) is false.

(d) Assertion (A) is false but Reason (R) is true.

Q.20 **Assertion (A) :** In ΔABC and ΔPQR, AB = PQ, AC = PR and ∠BAC = ∠QPR then ΔABC ≅ ΔPQR   **1**

Reason (R) : Both the triangles are congruent by SSS congruence.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)

(b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A)

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

SECTION-B

Q.21 Find the area of a triangle ABC in which AB=AC=4cm and $\angle A = 90^0$ **2**

OR

Find the area of a triangle whose sides are 13cm,14cm and 15cm.
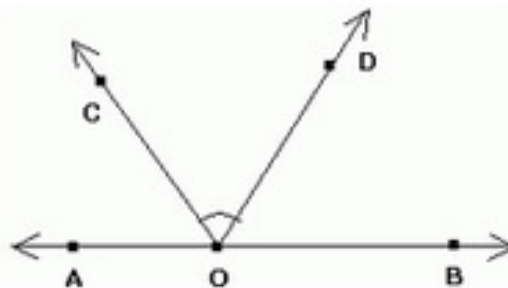
Q.22 Find two rational numbers between -1 and 1.   **2**

Q.23 Express $2.4\bar{3}$ in $\frac{p}{q}$ form.   **2**

Q.24 An angle is $\frac{2}{3}$ times its supplement. Determine its measure.   **2**

OR

In the given figure, if $\angle AOC + \angle BOD = 70^0$, find $\angle COD$.

Q.25 Give the equations of two lines passing through (3,12)   **2**

SECTION-C   **3**

Q.26 In which quadrant or on which axis do each of the points (-2,5), (3,-1),(-1,0), (1,2), (0,-9) and (-3,-5) lie?   **3**

Q.27 A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the minor arc.   **3**

Q.28 If the points A(1,2) and B(-1,3) lie on the line $ax + by = 7$, find the values of a and b.   **3**

OR

If $x = 2k - 1$ and $y = k$ is a solution of the equation $3x - 5y - 7 = 0$, then find the value of k.

Q.29 If $3^{x+1} = 9^{x-2}$ find the value of 3^{-x} **3**

OR

Solve for x: $\quad 2^{3x-7} = 1$

Q.30 ABC and DBC are two isosceles triangles on the same base BC. **3**

Show that $\angle ABD = \angle ACD$

Q.31 If $x = 2 + \sqrt{3}$, then find the value of $x + \dfrac{1}{x}$

SECTION-D

Q.32 The surface area of a sphere is 5544 cm^2, find its volume. **5**

Q.33 ABCD is a rectangle and P, Q, R and S are the mid-points of the sides AB, BC, CD and DA respectively. Show that the quadrilateral PQRS is a rhombus. **5**

OR

Prove that diagonals of a rhombus bisect each other at right angles.

Q.34 Find the value of k if $(3x - 4)$ is a factor of the polynomial $3x^2 - kx - 4$.and also find the other factor of the polynomial. **5**

Q.35 Express the linear equation $\left(\dfrac{x-1}{3}\right) = \left(\dfrac{y+1}{2}\right)$ in standard form. Find three solutions of the equation. **5**

OR

A three-wheeler scooter charges Rs. 15 for first kilometer and Rs. 8 for every subsequent kilometer. For a distance of x km, an amount of Rs y is paid. Write the linear equation representing the above equation. And also find three solutions of the above equation.

SECTION-E

Q.36 **Case Study - 1:**

Tarpaulin is an essential tool for keeping crops like hay dry during the harvest and storage periods. By covering crops and stockpiles, tarps create a physical barrier that effectively prevents rainfall and moisture from reaching stored products.

A farmer stitched a cover using tarpaulin to protect a heap of wheat which is in the form of a cone.

Assume the tarpaulin is in the shape of right circular cone

Based on above information answer the following questions.

(i) If the diameter of the base of the cone is 8m. Calculate the circumference of its base. **(1)**

(ii) If the height of the cone is 3m, then calculate its slant height. **(1)**

(iii) Calculate the curved surface area of the cone. **(2)**

OR

Calculate area of base of the cone.

Q.37 **Case Study - 2:**

Anita is a Mathematics teacher in Noida. After Periodic test 2, she asks a student to collect the mathematics marks of all the students of Class IX- A, B, and C and found that Rekha scored least mark 6 in the class and Ram scored the highest mark 59 in the class out of 60. He prepares the frequency distribution table using the collected marks and

draws Histogram using the table as shown in the adjoining figure.
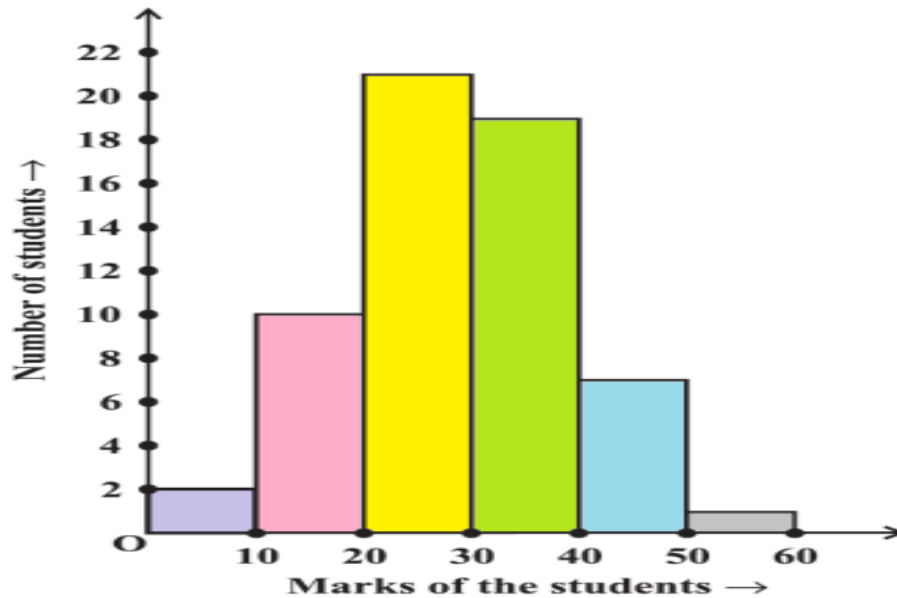
i) Find the width of the class. **(1)**

ii) Calculate range of above marks. **(1)**

iii) What is the total number of students in the Histogram? **(2)**

OR

How many students scored less than 50% marks?

Q.38 **Case Study –3 :**

During Maths lab activity each student was given four broom sticks of length 8 cm, 8 cm, 5 cm and 5 cm to make different types of quadrilaterals.

Based on above information answer the following questions.

(i)   Name the quadrilaterals that can be formed using these sticks **(1)**

(ii) If the ratio of the adjacent angles of a parallelogram is 2:3, then find the larger angle. **(1)**

(iii) If three angles of a quadrilateral are 105^0, 75^0 and 100^0, then find the measure of fourth angle. **(2)**

OR

The angles of a quadrilateral are in the ratio 3 : 4 : 5: 6, then calculate the angles.

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