SECOND SEMESTER EXAMINATION 2024-25 (English Medium)

Class - IX

Time : 2½ hrs.

MATHEMATICS

M.M.- 80

Attempt all questions from Section A and any four questions from Section B. All working including rough work, must be clearly shown, and must be done on the same sheet as the rest of the answer. Omission of essential working will result in loss of marks.

SECTION - A (40 Marks)

Attempt all questions from this section

1. Choose the correct answers to the questions from the given options: [15]

i) The slope of the line $3x - 2y + 5 = 0$.

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

ii) If $\cos^2\theta = \frac{3}{4}$, then the value of $\sin^2\theta$ is:

a) $\frac{1}{4}$ b) $\frac{\sqrt{3}}{2}$ c) $\frac{1}{\sqrt{2}}$ d) ½

iii) If $a - b = 4$ and $a + b = 6$ than what is the value of $a^2 + b^2$

a) 52 b) 26 b) 24 d) 46

iv) The surface area of a cuboid is 148 cm^2. If the length is 5cm and width is 6cm, the value of height is

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

v) If the diagonal of a square is 10 units, its area is

a) 25 square units b) 75 square units

c) 50 square units d) 100 square units

vi) The median of first ten prime numbers is

a) 8 b) 10 c) 12 d) 14

vii) The value of expression $\frac{3^{a+2} + 3^{a+1}}{4 \times 3^a - 3^a}$ is

a) 3 b) 9 c) 4 d) 8.

viii) In the equation $\log_7 (2x^2-1)=2$ the value of x is

a) 49 b) 50 c) 7 d) 5

ix) In ΔABC, M is midpoint of AB and a straight line through M and parallel to BC cuts AC at N. Find the length AN if BC = 7 cm and AC = 5 cm.

a) 3.5 cm b) 5.2 cm c) 5.3 cm d) 2.5 cm

x) At what rate of compound interest per annum will a sum of Rs. 1200 become Rs. 1348.32 in 2 years?

a) 7.5% b) 7% c) 6.5% d) 6%

xi) Assertion(A): The mean of 5 observation is 30. On excluding one of these observations, the mean of the remaining observation is increased to 31, the excluded observation is = 5X30-4X31=150-124=26

Reason (R): excluded observation is =5X31-4X30=155-120=35

a) A is true, R is false b) A is false, R is true

c) Both A and R are true d) Both A and R are false

xii) In Δ ABC, $\cot\frac{A+B}{2}$ is equal to:

a)) $\tan\frac{C}{2}$ b) $\cos\frac{C}{2}$ c) $\cot\frac{C}{2}$ d) $\sin\frac{C}{2}$

xiii) The sum of the interior angles of a regular hexagon is

a) 180^o b) 360^o c) 540^o d) 720^o

xiv) The length of the chord which is at distance is 6 cm from the center of the circle whose radius is 10cm is

a) 12cm b) 16cm c) 10cm d) 8cm

xv) A triangle and parallelogram are between the same parallels on same bases then if area of parallelogram is 176 cm^2, area of triangle is

a) $68cm^2$ b) $78cm^2$ c) $88cm^2$ d) $98cm^2$

2. a) A certain sum of money of compound interest amounts to Rs. 8820 in 2 years and amounts to Rs. 9724.05 in four years. Find the sum of the sum and the rate percent [4]

b) If $8\cot\theta = 15$, find the value of $\frac{(2+2\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(2-2\cos\theta)}$ [4]

c) Find value of a and b, if $\frac{3-5\sqrt{5}}{3+2\sqrt{5}} = a\sqrt{5} - b$. [4]

c) A swimming pool is 50 meter long and 15 meter wide. Its shallow and deep ends are 1.5 meters and 4.5 meters deep respectively. If the bottom of the pool slopes uniformly, find the amount of water in liters required to fill the pool.

6. a) Show that ABC is an equilateral triangle if A, B, C have the co-ordinates $(1, \sqrt{3})$, $(3, \sqrt{3})$ and $(2, 2)$ respectively. [3]

b) Prove that arc PR = arc QR if triangle PQR is inscribed in a circle and angle QPR = angle PQR. [3]

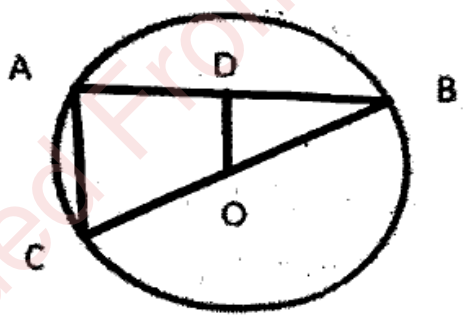
c) A point T is taken on side PQ of the parallelogram PQRS, and the line ST and RQ are produced to meet at V. prove that the triangle VSQ and VTR are equal in area. [4]

7. a) Find the area of triangle if the perimeter of a triangle is 540 m and its sides are in the ratio 25:17:12. Find the area of the triangle.[3]

b) ABCD is a parallelogram. AE is perpendicular to DC and CF is perpendicular to AD. If AB = 6 cm, CF = 10 cm and AE = 8 cm. find sides AD. [3]

c) Construct a hexagon of sides 3.4cm. and find its area. [4]

8. a) In the given figure, OD is perpendicular to the chord AB of circle, whose centre is O, prove that CA = 2OD [3]



b) Aditya secured 73,86,78 and 75 marks in four tests. What is the least number of marks he can secure in his next test, if his has to have a mean score of 80 marks in five tests? [3]

c) ABCD is a rhombus, RABS is a straight line such that RA = AB = BS. Prove that RD and SC when produced meet at right angle. [4]

9. a) The perimeter of a right triangle is 50 cm and hypotenuse is 18 cm. find its area. [3]

b) The area of three adjacent faces of a cuboid are x, y and z. if the volume is V, prove that $V^2 = XYZ$. [3]

3. a) ABCD is square, x and y are points on sides AD and BC respectively such that AY = BX, Prove that BY = AX and ∠BAY = ∠ABX.

b) Find the mean of the following frequency distribution

X	0.1	0.2	0.3	0.4	0.5	0.6
f	20	60	20	40	10	50

C) Solve given equations graphically: [5]

$3x - 2y = 4$

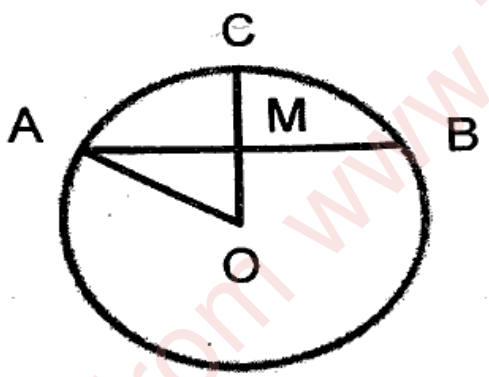
$5x - 2y = 0$

SECTION - B (40 Marks)

Attempt any four from this section

4. a) Calculate the angle ACD if ABCD is rhombus and Angle ABC is 140°. (State reason clearly). [3]

b) In the given figure, AB = 8 cm, CM = 1 cm, CM is perpendicular bisector of AB. find the radius OA = x cm. Find x. [3]



c) Represent the following data by frequency polygon? [4]

Class – Interval	frequency
10 - 20	3
20 – 30	7
30 - 40	6
40 – 50	2
50 - 60	5

5. a) If $4 \sin^2 \theta - 1 = 0$ and angle θ is less than 90°: find the value of θ and hence the value of $\cos^2\theta + \tan^2 \theta$.

b) The circumference of a circle exceeds the diameter by 16.8 cm. find radius of the circle. (Take Take $\pi = \frac{22}{7}$)

(P.T.O.)

c) The string of a kite is 150 m long and it makes an angle of 60 with the horizontal. Find the height of the kite from the ground. (take $\sqrt{3} = 1.73$) [4]

10.a) Factories : $5a^2 - b^2 - 4ab + 7a - 7b$ [3]

b) M and N are points on sides QR and PQ respectively of ΔPQR, right angled at Q. prove that:
$PM^2 + RN^2 = PR^2 + MN^2$ [3]

c) a) If $\text{Log}_{10} x = 2a$ and $\log_{10} y = \frac{b}{2}$ [4]

i) Write 10^a in terms of x.

ii) Write 10^{2b+1} in terms of y

iii) If $\log_{10} P = 3a - 2b$, express P in terms of x and y

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