विद्या सर्वार्थि साधिका

ANANDALAYA
ANNUAL EXAMINATIION
Class: IX

Subject: Mathematics (041) M.M: 80
Date : 28–02–2024 Time: 3 hours

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 integrated units of assessment (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.
8. Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

SECTION – A

1. A point P(a, b) is such that: a < 0, b > 0. In which quadrant does the point P lie? (1)
   (A) First quadrant (B) second quadrant
   (C) third quadrant (D) Fourth quadrant

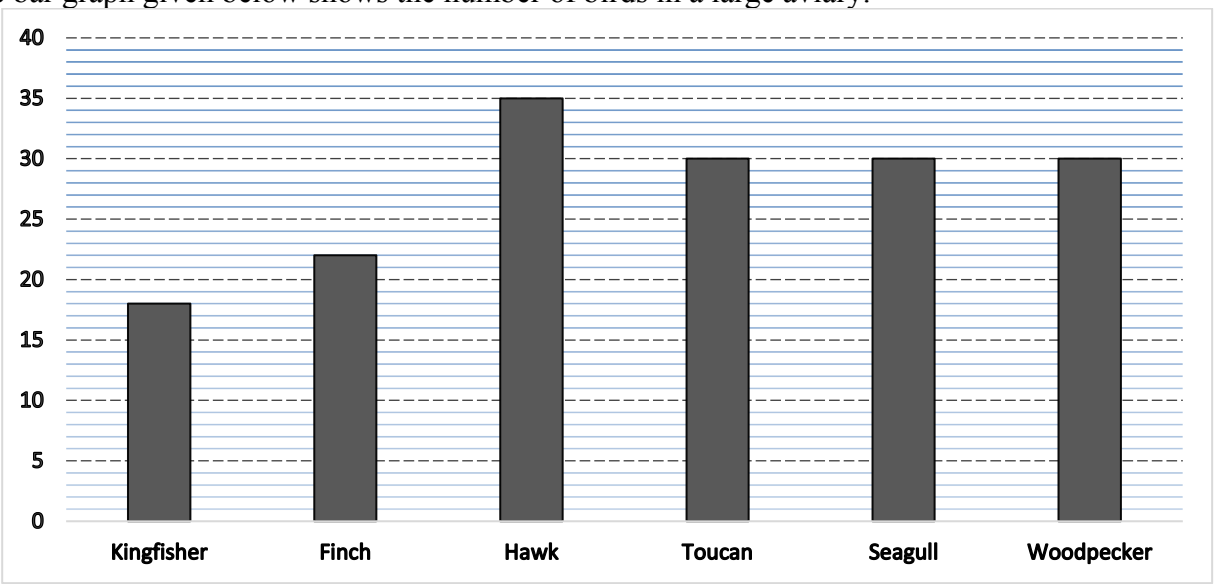
2. In ΔABC, ∠A = ∠C and BC = 4 cm and AC = 3 cm. The length of the side AB is _____. (1)
   (A) 2 cm (B) 4 cm (C) 3 cm (D) 2.5 cm

3. Factors of $x^2 - 5x - 6$ are _____. (1)
   (A) (x – 2), (x – 3) (B) (x + 2), (x – 3) (C) (x – 6), (x + 1) (D) (x + 6), (x – 1)

4. Given a circle of radius 5 cm and centre O. OM is drawn perpendicular to the chord XY. If OM = 3cm, then what is the length of chord XY? (1)
   (A) 4 cm (B) 6 cm (C) 8 cm (D) 10 cm

5. If the volume and surface of a sphere are numerically equal, then its diameter is _____. (1)
   (A) 2 cm (B) 4 cm (C) 3 cm (D) 6 cm

6. The bar graph given below shows the number of birds in a large aviary. (1)



How many more Hawks are there in aviary than Toucans?
(A) 2 (B) 3 (C) 5 (D) 7

7. Slant height of a cone is 34 cm and base diameter is 32 cm, then what will be height of the cone? (1)
(A) 33 cm (B) 25 cm (C) 38 cm (D) 30 cm

8. How many common points do two distinct lines have? (1)
(A) 0 (B) 1 (C) 2 (D) 2

9. Find the value of b, if x = 5 and y = 0 is a solution of the equation $3x + 5y = b$. (1)
(A) 5 (B) – 5 (C) – 15 (D) 15

10. Write the coefficient of z in the expansion of $(5 - z)^2$. (1)
(A) 25 (B) – 5 (C) – 10 (D) 10

11. Diagonals of a rhombus ABCD intersect each other at O, then, what are the measurements of vertically opposite angles ∠AOB and ∠COD? (1)
(A) 180°, 180° (B) 60°, 90° (C) 60°,60° (D) 90°, 90°

12. If ABCD is a rhombus and the diagonal AC and BD intersect at O. If AO = 4 cm and DO = 3 cm. Then find the perimeter of the rhombus ABCD. (1)
(A) 18cm (B) 20cm (C) 21 cm (D) 22 cm

13. Diagonals of a cyclic quadrilateral are the diameters of that circle, then the quadrilateral is _____. (1)
(A) Parallelogram (B) square (C) rectangle (D) trapezium

14. A gardener has to put fence all round a triangular path with sides 120m, 80m and 60m. In the middle of each side, there is a gate of width 10 m. find the length of the wire needed for the fence. (1)
(A) 250 m (B) 290 m (C) 230 m (D) 460 m

15. If AB = CQ, BC = PR and CA = PQ, then which congruency is the correct explanation of the given sides? (1)
(A) ΔABC ≅ ΔPQR (B) ΔCBA ≅ ΔPRQ
(C) ΔBAC ≅ ΔRPQ (D) ΔPQR ≅ ΔBCA

16. How many dimensions does solid have? (1)
(A) 1 (B) 2 (C) 3 (D) 4

17. If the coordinates of the two points are P (– 5, 3) and Q (8 – 9), then find the difference of the value of (abscissa of Q) to (abscissa of P). (1)
(A) 4 (B) – 12 (C) – 14 (D) 13

18. Two supplementary angles x and y are in the ratio 1: 4, find the value of x and y. (1)
(A) 36° and 144° (B) 18° and 72° (C) 144° and 36° (D) 72° and 18°

In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.
(A) Both A and R are true and R is the correct explanation of A.
(B) Both A and R are true but R is not the correct explanation of A.
(C) A is true but R is false.
(D) A is false but R is true.

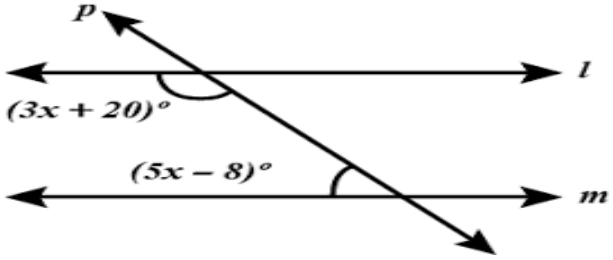
19. Assertion: $a^m \times a^n = a^{m+n}$. (1)
Reason: Exponents can be added if base is same in product of numbers.

20. Assertion: The angles of a quadrilateral PQRS are $2x°, (x + 10)°, (x - 30)°$ and $(x + 20)°$. The smallest angel is equal to 42°. (1)
Reason: Sum of all the angles of a quadrilateral is 360°.

SECTION – B

21. P (3, 2) and Q (7, 7) are two points. Perpendiculars are drawn to the x-axis from P and Q meeting the x-axis at L and M respectively. (2)
(i) Find the coordinates of L and M.
(ii) Find the lengths of LM.

22. In the given figure, if $l||m$ what is the value of x. (2)



23. Simplify $\frac{6-4\sqrt{3}}{6+4\sqrt{3}}$ by rationalizing the denominator. (2)

24. The perimeter of a triangular table is 900 cm and its sides are in the ratio 3: 4: 5. Using Heron's formula, find the area of triangular table. (2)

OR

Prove that the area of an isosceles triangle of sides a cm, a cm and b cm is $\frac{1}{4}b\sqrt{4a^2 - b^2}$ cm^2.

25. If point K$(p, 2p + 1)$ is the solution of the equation $5x + 3y = 69$, find the value of p also write the coordinate of K. (2)

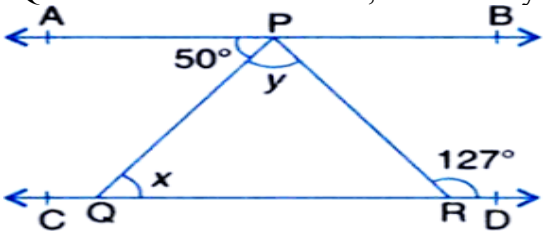
OR

If the adjacent side of a rectangle are in the ratio 3: 2. If the perimeter of the rectangle is 60 cm. Then find the sides of the rectangle.

SECTION – C

26. Write $2x + 3y = 27$ in the form of $y = mx + c$, Find the value of m and c. Also check that the point M (4,3) lies of this linear equation? (3)

27. In Fig. 6.26, if AB || CD, ∠ APQ = 50° and ∠ PRD = 127°, find x and y. (3)



28. Simplify: $\frac{9^{\frac{1}{3}} \times 27^{-\frac{1}{2}}}{3^{\frac{1}{6}} \times 3^{-\frac{2}{3}}}$. (3)

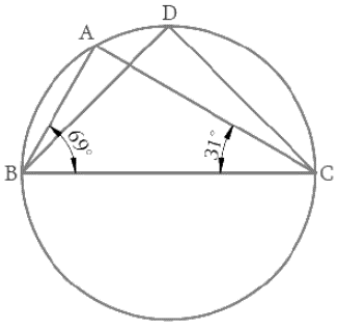
OR

Express given number $3.\overline{2}$ in the form of p/q, where p and q are integers and q ≠ 0.

29. If two equal chords of a circle intersect within the circle, prove that the line joining the point of intersection to the centre makes equal angles with the chords. (3)

OR

In the given figure, ∠ ABC = 69°, ∠ ACB = 31°, find the ∠ BDC.



30. The difference between the adjoining sides containing right angle of a right-angles triangle is 14cm. The area of triangle is 120 sq cm. Find the length of sides and also verify this area by using Heron's formula. (3)

31. If $2x + 3y = 12$ and xy = 6, find the value of $8x^3 + 27y^3$. (3)

SECTION – D

32. Following are the runs scored by two teams A and B in a 10 over match. Represent the data graphically on the same graph. (5)

Over	1	2	3	4	5	6	7	8	9	10
Team A	2	1	8	9	4	5	6	10	6	2
Team B	5	6	2	10	5	6	3	4	8	10

OR

Draw a histogram and frequency polygon on the same graph for the following data.

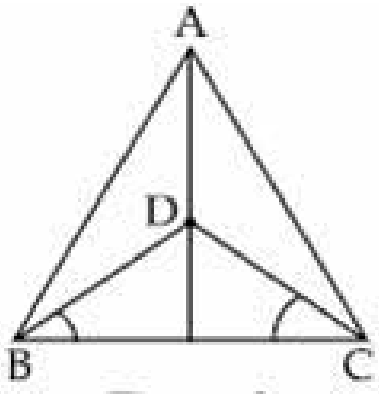
Class interval	Frequency
150 – 200	5
200 – 250	3
250 – 300	5
300 – 350	6
350 – 400	8
400 – 450	7
450 – 500	1

33. Find the value of a and b so that x + 1 and x – 1 are factors of $x^4 + ax^3 + 2x^2 - 3x + b$. (5)

34. Prove that 'Two triangles are congruent if any two angles and the included side of one triangle is equal to any two angles and the included side of the other triangle'. (5)

OR

In the given figure, AB = AC and D is a point in the interior of ΔABC such that ∠DBC = ∠DCB. Prove that AD bisects ∠BAC of ΔABC.



35. In the centre of the city garden, Municipal Corporation decided to crate small planetarium. The cost of making spherical planetarium ball is ₹ 33,957 at the rate of ₹ 7 per cubic metre. What will be the diameter of the planetarium ball? (5)

SECTION – E

36. The information regarding rational and irrational numbers taken from one of the reference books is as below:
    - There are infinite rational numbers between any two rational numbers.
    - Rationalisation of a denominator means to change the irrational denominator to rational form.
    - A number is irrational if its decimal form is non-terminating non-recurring.

    On the bases of these key points, Answer the following questions.

(i) What is the reciprocal of $2 + \sqrt{3}$ with rational denominator? (1)

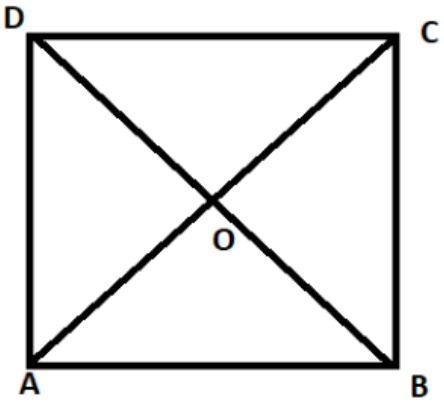
(ii) Write a rational number between $\sqrt{2}$ *and* $\sqrt{3}$. (1)

(iii) If $\frac{1}{\sqrt{7}} = a + b\sqrt{7}$,where a and b are integer. Find the value of a and b, (2)

OR

(iii) Find the value of $(\sqrt{11} + \sqrt{7}) \times (\sqrt{11} - \sqrt{7})$.

37. Rajni is studying in class IX. Her father purchased a plot of land which is in a square shape. After visiting the land, A few questions occurred to her.
Give answers to her questions by looking at the figure.



(i) What will be the measure of ∠AOB? (1)

(ii) If the value of OC = 10 m then what will be value of AO? Justify your answer. (1)

(iii) If the diagonal AC = $20\sqrt{2}$ m then what will be the perimeter of plot? (2)

OR

(iii) If the area of ΔAOB = 25 m^2, what will be the area of square?

38. On his birthday, Manoj decided to celebrate his birthday in a small orphanage centre. He bought apples to give to children and adults working there. Manoj donated 2 apples to each child and 3 apples to each adult along with Birthday cake. He distributed 60 apples in total.

(i) How to represent the above situation in linear equations in two variables by taking the number of children as 'x' and the number of adults as 'y'? (1)

(ii) Find the value of b, if x = 5, y = 0 is a solution of the equation 3x + 5y = b. (1)

(iii) If the number of children is 15, then find the number of adults? (2)

OR

(iii) If the number of adults is 12, then find the number of children?