CARMEL SENIOR SECONDARY SCHOOL, PORT BLAIR
FINAL EXAMINATION-2023-24

CLASS: IX
SUB: MATHEMATICS

M.M: 80
TIME: 3 HRS

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 1, 1 and 2 marks each respectively.
7. All questions are compulsory. However, an internal choice has been provided.
8. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.

SECTION – A

Section A consists of 20 questions of 1 mark each.

1. The value of $\left[(16)^{\frac{1}{2}}\right]^{\frac{1}{2}}$ is _____.
   a) 2   b) 4   c) 8   d) ½

2. $-\frac{\sqrt{28}}{\sqrt{343}}$ is _____ number.
   a) a natural   b) an integer   c) an irrational   d) a rational

3. If polynomial $p(x) = 3x^4 - 4x^3 - 3x - 1$ is divisible by $(x - 1)$, then the remainder is _____.
   a) 3   b) – 4   c) – 5   d) – 1

4. The value of $(15)^3 + (-8)^3 + (-7)^3$ is _____.
   a) – 840   b) – 2520   c) 1680   d) 2520

5. The perpendicular distance of the point P(5, 7) from the y–axis is _____.
   a) 5   b) 7   c) 2   d) 12

6. Abscissa of all the points on the x-axis is _____.
   a) 0   b) 1   c) ordinate   d) any number

7. The equation of x–axis is _____.
   a) y = b   b) y = 0   c) x = a   d) x = 0

8. The linear equation $5y - 3 = 0$, represented as $ax + by + c = 0$, has
   a) a unique solution   c) two solutions
   b) no solution   d) infinitely many solutions

9. There are _____ numbers of Euclid's Postulates.
   a) four   b) seven   c) five   d) six

10. In the given figure, find x
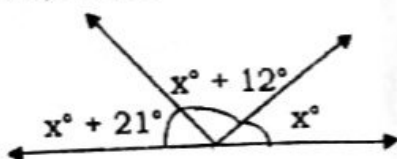
   a) 71°   b) 39°   c) 49°   d) 59°

11. In the given figure, ∠ABC = 69°, ∠ACB = 31°. Find ∠BDC
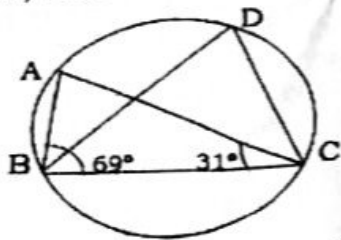
   a) 100°   b) 90°   c) 60°   d) 80°

12. It is given that △ABC ≅ △FDE and AB = 5 cm, ∠B = 40° and ∠A = 80°. Then, which of the following is true?
   a) DF = 5cm, ∠F = 60°   c) DE = 5 cm, ∠E = 60°
   b) DF = 5 cm, ∠E = 60°   d) DE = 5 cm, ∠D = 40°

13. In a parallelogram ABCD, if ∠A = 60°, then ∠D is equal to
   a) 110°   b) 140°   c) 120°   d) 130°

14. If the measure of an angle is twice the measure of its complementary angle then the measure of the angle is:
   a) 60°   b) 45°   c) 90°   d) 30°

15. If the semi-perimeter of a scalene triangle is 36 cm. Then its perimeter is
   _____
   a) 16 cm   b) 18 cm   c) 72 cm   d) 62 cm

16. Area of an equilateral triangle, of each side 2a units is _____ sq units.
   a) $\frac{\sqrt{3}}{4} a^2$ b) $\frac{\sqrt{3}}{2} a^2$ c) $\sqrt{3} a^2$ d) $2\sqrt{3} a^2$

17. Surface area of a sphere of diameter d cm is _____ sq cm.
   a) $\frac{1}{2}\pi d^2$ b) πd^2 c) $4\pi d^2$ d) $\frac{1}{4}\pi d^2$

18. The class width of the class intervals 10 – 19, 20 – 29, 30 – 39 is _____.
   a) 10   b) 9   c) – 9   d) – 10

DIRECTION: In the question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

Assertion (A): Slant height of a cone is 34 cm and base diameter is 32 cm, then the height of the cone is 30 cm.

Reason (R): Formula for the curved surface area of a cone is $\pi r l$ sq units, where r and l are radius and slant height respectively.

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

20. **Assertion (A):** In the given figure, ABCD is a cyclic quadrilateral in which $\angle A = (2x + 40)^\circ$ and $\angle C = (3x + 20)^\circ$, then the value of x is 24°.
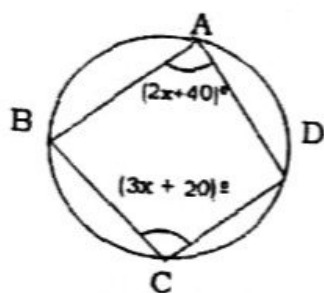
Reason (R): Opposite sides of a cyclic quadrilateral are equal.

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

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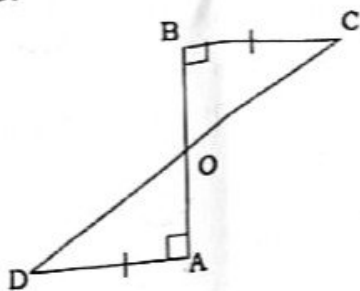
Section-B
Section B consists of 5 questions of 2 marks each

21. Identify the following as rational or irrational numbers:

a) $\sqrt{1.44}$ b) 0.3967   c) $(7 + \sqrt{2}) - (4 + \sqrt{2})$ d) $\sqrt{55}$

22. a) If a point C lies between two points A and B such that AC = BC, then prove that $AC = \frac{1}{2} AB$. Explain by drawing the figure.

[OR]

b) Write any two axioms of the Euclid?

23. In which quadrant or on which axis do the following points lie.

(i) (–2,3)   (ii) (0, 7)   (iii) (–4, –4)   (iv) (8, –1)

24. a) The height of a cone is 15 cm. If its volume is 1570 cm³, find the radius of the base. (Use π = 3.14)

   [OR]

   b) The diameter of the moon is approximately one–fourth of the diameter of the earth. What fraction of the volume of the earth is the volume of the moon?

25. In given figure, AD and BC are equal perpendiculars to a line segment AB. Show that CD bisects AB.

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Section-C

Section C consists of 6 questions of 3 marks each

26. If $p = \dfrac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}}$ and $q = \dfrac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$, then find $(p + q)^2$.

27. a) Express $0.5\overline{7}$ in the form $\dfrac{p}{q}$, where p and q are integers and $q \neq 0$.

   [OR]

   b) Express $0.\overline{234}$ in the form $\dfrac{p}{q}$, where p and q are integers and $q \neq 0$.

28. a) Expand: (i) $(2a - b + c)^2$ (ii) $(2x - 3y)^3$

   [OR]

   b) Evaluate, using identities: (i) 104 x 95   (ii) $(102)^3$

29. If x = –3 and y = 2 is the solution of the linear equation 3y = 2x + k, then find the value of k. Also, find two more solutions of the given equation.

30. Prove that the line drawn through the centre of a circle to bisect a chord is perpendicular to the chord.

31. Find the values of k, if (x + 1) is the factor of the polynomials.

   (i) $x^3 + kx^2 - 2x + k + 5$,   find k.

   (ii) $x^4 + k^2x^2 - 4k + 6x$,   find k.

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Section-D

Section D consists of 4 questions of 5 marks each

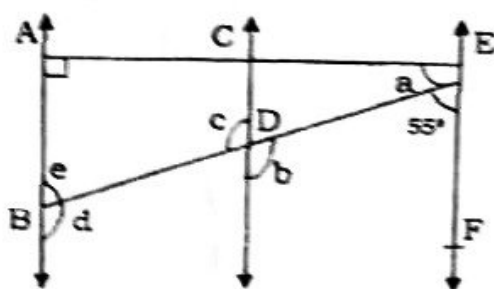a) Divide $3y^4 - 8y^3 - y^2 - 5y - 5$ by $y - 3$ and find the quotient and remainder.

[OR]

b) Verify that: $x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x + y + z)[(x - y)^2 + (y - z)^2 + (z - x)^2]$.

33. Draw a histogram of the given data, marks scored by the students of class IX in mathematics out of 80 marks.

Marks	0 – 20	20 – 30	30 – 50	50 – 60	60 – 80
No. of Students	10	15	20	15	10

34. In given figure, AB∥CD and CD∥EF. Also EA⊥AB. If $\angle BEF = 55°$, find the values of a, b, c, d and e.

35. a) ABCD is a quadrilateral in which P, Q, R and S are mid-points of the sides AB, BC, CD and DA. AC is a diagonal.
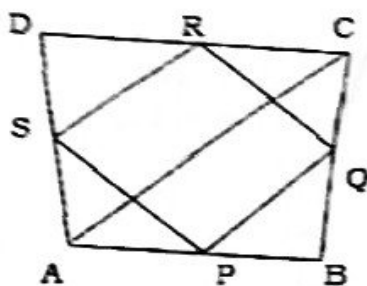
Show that

(i) SR ∥ AC and SR = $\frac{1}{2}$ AC

(ii) PQ = SR

(iii) PQRS is a parallelogram.

[OR]

b) Three girls Riya, Saranya and Mahi are playing a game by standing on a circle of radius 5 m drawn in a park. Riya throws a ball to Saranya, Saranya to Mahi and Mahi to Riya. If the distance between Riya and Saranya and between Saranya and Mahi is 6 m each, what is the distance between Riya and Mahi?

Section-E

Section E consists of 3 CASE BASED questions of 4 marks each

36. Students of class IX were explained about the concept and properties of triangles. For this purpose Mr. Rohit, a mathematics teacher has drawn a triangle on board and asked following questions on the triangle.
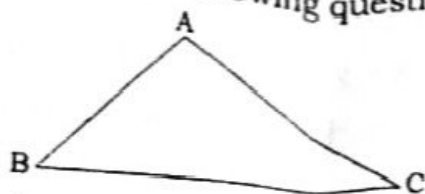

The sides of the triangle are in the ratio 13 : 12 : 5 and its perimeter is 450 m.

a) Find the semi–perimeter. **(1 mark)**
b) Find the sides of triangles. **(1 mark)**
c) Find the area of the triangle. **(2 marks)**

37. Jeetraj has drawn a circle on the board with centre O, where AB and CD are straight lines through the centre O of the circle and ∠AOC = 80° and ∠CDE = 40°. He asks some questions from the drawing.
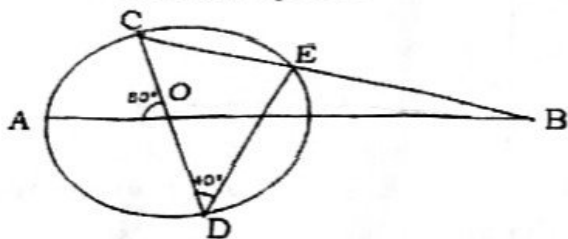
a) What is the measure of ∠CED? Give reason. **(1 mark)**
b) Find the measure of ∠DCE. **(1 mark)**
c) Find the measure of ∠ABC. **(2 marks)**

38. Sherly has a piece of canvas whose area is 551 m². She uses it to have a conical tent made, with a base radius of 7 m. Assuming that all the stitching margins and the waste incurred while cutting, amounts to approximately 1 m², find the volume of the tent that can be made with it.

Conical tent

7m
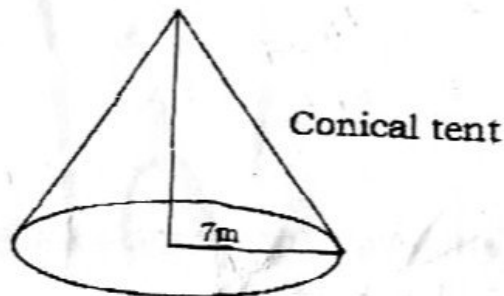
a) What is the slant height of the conical tent? **(1 mark)**
b) Find the height of the tent. **(1 mark)**
c) What is the volume of the conical tent? **(2 marks)**

*************************ALL THE BEST*************************