

SPECTRA FINAL PREPARATORY TEST

SPECTRA CLASSES

CLASS – 9TH

SUBJECT – MATHEMATICS

TIME – 3 HR.

MM: 80

General Instruction:

1. This question paper consists of 38 questions. All questions are compulsory.
2. This question paper is divided into five Sections - A, B, C, D and E.
3. Section A Question numbers 1 to 17 are multiple choice questions (MCQs) and questions numbers 18 to 20 are Assertion - Reason based questions of 1 mark each.
4. Section B, Question numbers 21 and 25 are very short answer (VSA) type questions. Carrying 2 marks each.
5. Section C, Question numbers 26 and 31 are short answer (SA) type questions. Carrying 3 marks each.
6. Section D, Question numbers 32 and 35 are long answer (LA) type questions. Carrying 5 marks each.
7. Section E, Question numbers 36 and 38 are case-study based integrated question carrying 4 marks each. Internal choice is provided in 2 marks question in each case-study.
8. There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C, 2 questions in Section C, 2 questions in Section D and 3 questions of 2 marks in Section E.
9. Draw neat diagrams wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated.
10. Use of calculators is NOT allowed.

SECTION - A

1. Which of the following is equal to x ?

(a) $x^{\frac{12}{7}} - x^{\frac{5}{7}}$ (b) $\sqrt[12]{(x^4)^{\frac{1}{3}}}$ (c) $(\sqrt{x^3})^{\frac{2}{3}}$ (d) $x^{\frac{12}{7}} \times x^{\frac{7}{12}}$

2. The difference between the highest and lowest values of the observations is called

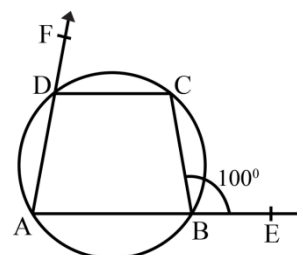
(a) frequency (b) mean (c) range (d) class-intervals

3. If a solid sphere of radius r is melted and cast into the shape of a solid cone of height r , then the radius of the base of the cone is

(a) $2r$ (b) $3r$ (c) r (d) $4r$

4. In Fig. Sides AB and AD of quadrilateral ABCD are produced to E and F respectively. If $\angle CBE = 100^\circ$, then $\angle CDF =$

(a) 100° (b) 80°
(b) 130° (d) 90°



5. The bisectors of exterior angles at B and C of $\triangle ABC$ meet at O. If $\angle A = x^\circ$, then $\angle BOC =$.

(a) $90^\circ + \frac{x^\circ}{2}$ (b) $90^\circ - \frac{x^\circ}{2}$ (c) $180^\circ + \frac{x^\circ}{2}$ (d) $180^\circ - \frac{x^\circ}{2}$

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6. Which of the following is irrational?

- (a) $\sqrt{\frac{4}{9}}$ (b) $\frac{\sqrt{12}}{\sqrt{3}}$ (c) $\sqrt{81}$ (d) $\sqrt{5}$

7. If $x + \frac{1}{x} = 7$, then $x^3 - \frac{1}{x^3}$

- (a) $9\sqrt{5}$ (b) $144\sqrt{5}$ (c) $135\sqrt{5}$ (d) $\sqrt{5}$

8. If $x^2 + kx + 6 = (x + 2)(x + 3)$ for all x , then the value of k is

- (a) 1 (b) -1 (c) 5 (d) 3

9. Any point on the line $y = x$ is of the form

- (a) (a, a) (b) $(0, a)$ (c) $(a, 0)$ (d) $(a, -a)$

10. The radius of a hemispherical balloon increases from 6 cm to 12 cm as air is being pumped into it. The ratio of the surface areas of the balloon in the two cases is

- (a) 1: 4 (b) 1: 3 (c) 2: 3 (d) 2: 41

11. If every side of a triangle is doubled, then increase in the area of the triangle, is

- (a) $100\sqrt{2}\%$ (b) 200% (c) 300% (d) 400%

12. Point $(1, 1), (1, -1), (-1, 1), (-1, -1)$

- (a) Lie in I quadrant (b) lie in III quadrant
(c) lie in I and III quadrants (d) do not lie in the same quadrant

13. Euclid stated that all right angles are equal to each other in the form of

- (a) an axiom (b) a definition (c) a postulate (d) a proof

14. In a quadrilateral $ABCD$, $\angle A + \angle C$ is 2 times $\angle B + \angle D$. If $\angle A = 140^\circ$ and $\angle D = 60^\circ$, then $\angle B =$

- (a) 60° (b) 80° (c) 120° (d) None of these

15. Which of the linear equation has solution as $x = 2, y = 3$?

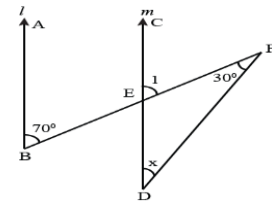
- (a) $2x + y = 8$ (b) $x + 2y = 8$ (c) $x + y = 8$ (d) $-x + y = 8$

16. The area of a right triangle is 28 cm^2 . If one of its perpendicular sides exceeds the other by 10 cm, then the length of the longest of the perpendicular is

- (a) 16 cm (b) 14 cm (c) $6\sqrt{5}$ cm (d) 18 cm

17. In Fig. If lines l and m are parallel lines, then $x =$

- (a) 105° (b) 65°
 (c) 40° (d) 25°



Statement-1 (Assertion) and Statement-2 (Reason) and following four choices (a), (b), (c) and (d) only one of which is the correct answer. Mark the correct choice.

- (a) Statement-1 is true, Statement-2 is true; Statement-2 is a correct explanation for Statement-1.
 (b) Statement-1 is true, Statement-2 is true; Statement-2 is not a correct explanation for Statement-1.
 (c) Statement-1 is true, Statement-2 is false.
 (d) Statement-1 is false, Statement-2 is true

18. Statement-1 (Assertion): Euclidean geometry is valid only for curved surfaces.

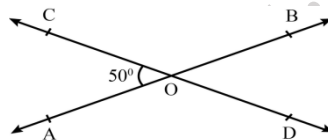
Statement-2 (Reason): The things which are double of the same thing are equal to one another.

19. Statement-1 (Assertion): The diagonals of a parallelogram bisect each other.

Statement-2 (Reason): If the diagonals of a parallelogram are equal and intersect at right angle, then it is a square.

20. Statement-1 (Assertion): In Fig. Lines AB and CD intersect at O. If $\angle AOC = 50^\circ$, then $\angle BOC = 130^\circ$

Statement-2 (Reason): If two lines intersect, then vertically opposite angles are equal.



Section -B

This section consists of 5 questions of 2 marks each.

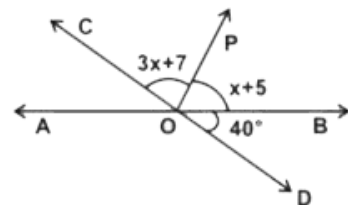
21. Simplify : $\frac{\sqrt{5} + \sqrt{3}}{\sqrt{80} + \sqrt{48} - \sqrt{45} - \sqrt{27}}$

OR

Find the value of x , $\sqrt[3]{2x + 3} = 5$

22. Show that $(x-5)$ is a factor of $x^3 - 3x^2 - 4x - 30$.

23 In the given figure AB and CD are two straight lines intersecting at O and OP is a ray. What is the measure of $\angle AOD$? Also find the value of x .



24 A cone and a hemisphere have equal base and equal volumes. Find the ratio of their heights.

OR

A conical pit of diameter 7m is 25m deep. Find its capacity in kiloliters.

25. Prepare a continuous grouped frequency distribution from the following data :

| Mid-point | Frequency |
|-----------|-----------|
| 5 | 4 |
| 15 | 8 |
| 25 | 13 |
| 35 | 12 |
| 45 | 6 |

Also find the size of class intervals.

Section - C

This section consists of 6 questions of 3 marks each.

26. Find the product of $(p - \frac{1}{p})(p + \frac{1}{p})(p^2 - \frac{1}{p^2})(p^2 + \frac{1}{p^2})$

27. Name the figure obtained by joining the points B(5,3), E(5,1), S(0,1) and T(0,3). Also find the area of the figure.

28. If $x = 3k-2$, $y = 2k$ is a solution of equation $4x-7y+12 = 0$, then find the value of k.

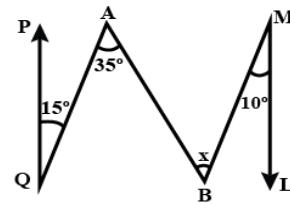
OR

If $(m-2, 2m+1)$ lies on equation $2x+3y-10 = 0$, find m.

29. Prove that the bisectors of the angles of a linear pair form right angle.

OR

In the given figure $QP \parallel ML$, find the value of x.



30. If two non parallel sides of a trapezium are equal then prove that it is cyclic quadrilateral.

31 . Draw the histogram from the following data :

| | | | | | |
|-----------|------|-------|-------|-------|-------|
| Class | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
| Frequency | 8 | 15 | 20 | 12 | 16 |

Section - D

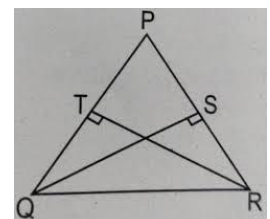
This section consists of 4 questions of 5 marks each.

32 . Show that $\frac{7\sqrt{3}}{\sqrt{10+\sqrt{3}}} - \frac{2\sqrt{5}}{\sqrt{6+\sqrt{5}}} - \frac{3\sqrt{2}}{\sqrt{15+3\sqrt{2}}} = 1$

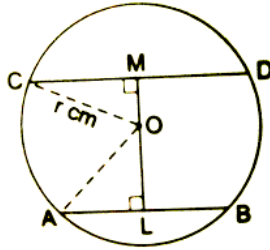
33. In the given figure , PQR is a triangle in which altitudes QS and RT to sides PR and PQ are equal. Show that :

(i) $\Delta PQS \cong \Delta PRT$

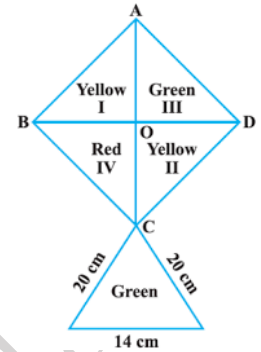
(ii) PQR is an isosceles triangle



34. AB and CD are two parallel chords of a circle which are on opposite sides of the centre O such that AB = 10 cm, CD = 24 cm and the distance between AB and CD is 17 cm. Find the radius of the circle.



35. How much paper of each shade is needed to make a kite given in figure, in which ABCD is a square with diagonal 44cm.



OR

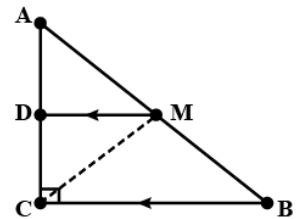
The area of a trapezium is 475 cm^2 and height is 19 cm. Find the lengths of its two parallel sides if one side is 4 cm greater than the other.

Section - E

This section consists of 3 Case - Study Based Questions of 4 marks each.

36. The line segment joining the mid-points any two sides of a triangle is parallel to the third side and equal to half of its is called mid-point theorem.

Let ABC is a right angle triangular field right angle at C. A line through the mid-point M of hypotenuse AB parallel to BC intersect AC at D, as shown in figure.



Solve the questions based on above paragraph.

- (i) Show that D is the mid-point of AC in above figure.
- (ii) Prove that $MD \perp AC$
- (iii) Prove that $CM = MA = \frac{1}{2} AB$

37. An object which is thrown or projected into the air, subject to only the acceleration of gravity is called projectile, and its path is called its trajectory. This curved path was shown by Galileo to be a parabola. Parabola is represented by a polynomial. If the polynomial to represent the distance covered is:

$$P(x) = -3x^2 + 24x + 12$$

- (i) What is the degree of the polynomial ?
 (a) 0 (b) 1 (c) 2 (d) 3
- (ii) Find the height of the projectile 5 seconds after its launch.
 (a) 57 m (b) 32 m (c) 85m (d) 68 m
- (iii) The polynomial is classified as on the basis of number of terms.
 (a) Linear polynomial (b) Monomial (c) Binomial (d) Trinomial

- (iv) The name of polynomial of the basis of degree is
(a) Cubic polynomial (b) Constant polynomial
(c) Quadratic polynomial (d) Bi-quadratic polynomial

38. Ekta a young girl found a spherical coconut. She consumed the water of the coconut and used her creativity by decorating the outer spherical covering of the coconut and sold it. The radius of the coconut was 2.1 cm. (considering the thickness of coconut negligible and coconut fully filled with water).



Based on the above situation, answer the following questions:

- (i) What was the surface area of spherical coconut ?
(ii) If Ekta could decorate only half coconut using paper then what should be the area of required paper?
(iii) If the price of decorating coconut is Rs 5 per sq cm then what would be price of decorating the whole coconut ?
(iv) What was the volume of coconut water Ekta consumed ?
