

# SPECTRA FINAL PREPARATORY TEST

SPECTRA CLASSES

CLASS – 9<sup>TH</sup>

SUBJECT – MATHS

TIME – 3 HR.

MM: 80

## General Instruction:

1. This question paper consists of 38 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 marks each.
4. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.
5. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source based/case based units o assessment of 04 marks each with sub-parts.

## Section – A

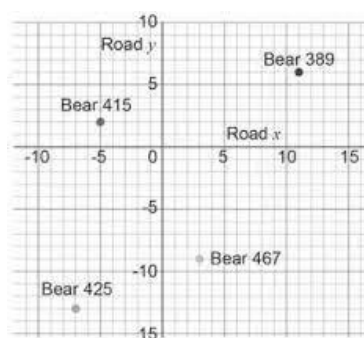
Consists of 20 questions of 1 marks each

1. A forest ranger keeps track of bears in his area He plotted their location on a graph. The origin represents the ranger's control room's location. To access and maintain equipment, Road x and Road y have been laid and paved inside the forest. They pass through the control room.

One unit on the graph paper represents 1 km.

Which bear is nearest to a paved road?

- (a) Bear 389      (b) Bear 415  
(c) Bear 425      (d) Bear 467



2. Ravi planted a red maple tree sapling. The height of the sapling is 0.25 m. The average growth rate of the height of a red maple tree is 0.27 m per year.

The average life of a red maple tree is 80–100 years. Ravi estimated that his tree will grow up to 27 m.

What is the likely reason behind his estimation?

Which of the following equations represents the height (h) of the red maple tree after 't' years of planting?

- (a)  $h=0.25+0.27$       (b)  $h=0.25t+0.27$       (c)  $h=0.25+0.27t$       (d)  $h=0.25+0.27t$

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3. Two lines intersect at a point P.

Which of the following is true for the distance between the two lines as they travel beyond point P?

- (a) The distance becomes constant.
- (b) The distance increases continuously.
- (c) The distance decreases continuously.
- (d) The distance increases and decreases depending upon the intersection point.

4. The angle which is one fifth of its complement is

- (a)  $25^\circ$
- (b)  $45^\circ$
- (c)  $15^\circ$
- (d)  $55^\circ$

5. The sum of the opposite angles of a cyclic quadrilateral is

- (a)  $90^\circ$
- (b)  $180^\circ$
- (c)  $100^\circ$
- (d)  $360^\circ$

6.  $\frac{1}{\sqrt{9} - \sqrt{8}}$  is equal to

- (a)  $\frac{1}{2}(3-2\sqrt{2})$
- (b)  $\frac{1}{3+2\sqrt{2}}$
- (c)  $3-2\sqrt{2}$
- (d)  $3+2\sqrt{2}$

7. What is the degree of the polynomial  $(x^3 + 5)(4 - x^5)$  ?

- (a) 5
- (b) 8
- (c) 2
- (d) 7

8. Which out of the following is not the linear equation in two variables?

- (a)  $2x = 3$
- (b)  $4 = 5x - 4y$
- (c)  $x^2 + x = 1$
- (d)  $x - \sqrt{2y} = 3$

9. A triangle whose all three sides are unequal is called

- (a) Scalene triangle
- (b) Isosceles triangle
- (c) Equilateral triangle
- (d) Right triangle

10. In parallelogram ABCD,  $AB = (2y - 3)$  and  $CD = 5$  cm then value of y is

- (a) 8 cm
- (b) 4 cm
- (c) 6 cm
- (d) 10 cm

11. The radius and slant height of a cone are in the ratio 4:7. If its curved surface area is  $792 \text{ cm}^2$ , then its radius is

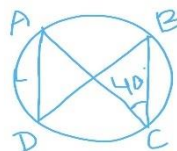
- (a) 8 cm
- (b) 12 cm
- (c) 6 cm
- (d) 15 cm

12.  $\frac{1}{\sqrt{2}}$  is a / an \_\_\_\_\_ number.

- (a) Rational
- (b) Irrational
- (c) Fractional
- (d) None of these

13. In the given figure,  $AD \parallel BC$  and  $\angle BCA = 40^\circ$ . The measure of  $\angle DBC$  is equal to

- (a)  $40^\circ$
- (b)  $60^\circ$
- (c)  $50^\circ$
- (d)  $75^\circ$



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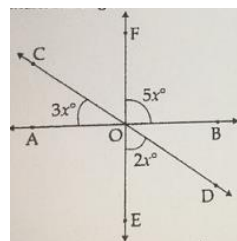
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14. In the given figure, lines AB, CD and EF meet at O. The value of x is

- (a)  $18^\circ$
- (b)  $54^\circ$
- (c)  $90^\circ$
- (d)  $36^\circ$



15. The volume of a right circular cone with radius 6 cm and height 7 cm is

- (a)  $225 \text{ cm}^3$
- (b)  $184 \text{ cm}^3$
- (c)  $165 \text{ cm}^3$
- (d)  $264 \text{ cm}^3$

16. Euclid's belong to the country

- (a) India
- (b) Greece
- (c) Egypt
- (d) Babylonia

17. A diagonal of a parallelogram divides it into two \_\_\_\_\_ triangles.

- (a) Right angled
- (b) Equilateral
- (c) Congruent
- (d) Similar

18. Euclid's divided his famous treatise 'The Elements' into

- (a) 13 chapters
- (b) 12 chapters
- (c) 11 chapters
- (d) 9 chapters

**Directions : In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:**

- (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, but 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.

19. Assertion (A): The point of the form  $(a, -a)$  lies on the line  $x + y = 0$ .

Reason (R): Any point which satisfies the equation  $ax + by + c = 0$  is the solution of the equation.

20. Assertion (A): If the volumes of two spheres are in the ratio  $27 : 8$ , then their surface areas are in the ratio  $3 : 2$ .

Reason (R): Volume of sphere  $= \frac{4}{3} \pi r^3$ .

Surface area of a sphere  $= 4\pi r^2$

### Section – B

Consists of 5 questions of 2 marks each

21. Find the value of k, if  $x - 2$  is a factor of  $f(x) = x^2 + kx + 2k$ .

22. Prove that a cyclic parallelogram is a rectangle.

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23. Represent the following frequency distribution by means of histogram.

| Marks              | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 |
|--------------------|-------|-------|-------|-------|-------|-------|
| Number of Students | 7     | 11    | 9     | 13    | 16    | 4     |

24. Sanya has a triangular piece of land. She wants to divide it into four equal areas. Suggest a way to do so?

**OR**

Does joining four distinct points always produce a quadrilateral? Justify your answer.

25. Factorize:  $8a^3 + 8b^3$

**OR**

Factorize:  $8x^3 - (2x - y)^3$

**Section – C**

**Consists of 6 questions of 3 marks each.**

26. Irrational numbers can provide more precision on measuring scale.  
What can be the possible arguments in favour and against this statement?

27. A polynomial is expressed as:  $p(x) = x^3 + x^2 - x - 1$   
At what values of  $x$  is the polynomial  $p(x) = 0$  ?

28. (i) Find values of  $a$  and  $b$ , if two ordered pairs  $(a-3, -6)$  and  $(4, a+b)$  are equal. 2  
(ii) Find in which quadrant point  $(a, b)$  lies. 1

**OR**

If the coordinates of a point  $A$  are  $(-2, 9)$  which can also be expressed as  $(1 + x, y^2)$  and  $y > 0$ , then find in which quadrant do the following points lie:  
 $P(y, x), S(2x, -3y)$

29. A joker's cap is in the form of right circular cone of base radius 7 cm and slant height 25 cm. Find the area of sheet required for 10 such caps.

**OR**

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?

30. A tile is made by joining the vertices of four equilateral triangles. The side length of the triangles is 15 cm. What is the area of the tile?

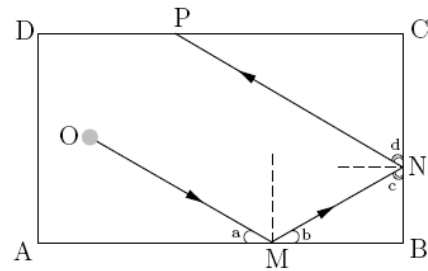
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31. The game of billiards is played with balls placed on a rectangular table. One ball is struck with the end of a stick, called a cue. The ball bounces into other balls and reflects off the sides of the table. In a real game, the ball may spin, but for mathematical purposes, it is considered that the ball travels in a straight line with the same reflection and incidence angles. On a billiard table ABCD, the ball placed at O is struck with the cue. What is the value of  $\angle a + \angle d$  ?



### Section – D

**Consists of 4 questions of 5 marks each**

32. If  $a = \frac{2^{x-1}}{2^{x+2}}$ ,  $b = \frac{2^{-x}}{2^{x+1}}$  and  $a - b = 0$ , find the value of  $x$ .

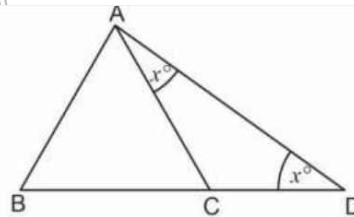
**OR**

If  $x = \frac{\sqrt{5}+1}{\sqrt{5}-1}$  and  $y = \frac{\sqrt{5}-1}{\sqrt{5}+1}$ , then find the value of  $x^2 + y^2$ .

33. PQ and RS are two parallel chords of a circle whose centre is O and radius is 10 cm. If PQ = 16 cm and RS = 12 cm, find the distance between PQ and RS if  
(i) On the same side of the centre O. (ii) On opposite side of the centre.

34. Using factor theorem, show that  $(m - n)$ ,  $(n - p)$  and  $(p - m)$  are factors of  $m(n^2 - p^2) + n(p^2 - m^2) + p(m^2 - n^2)$

35. In the figure below,  $BC = AC$ .  
What is the measure of  $\angle BAD$  ?



### Section – E

**Cased Based Subjective Questions.**

36. Prime Minister's National Relief Fund (also call PMNRF in short) is the fund raised to provide support for people affected by natural and man-made disasters. Natural disasters that are covered under this include flood, cyclone, earthquake etc. Man-made disasters that are included are major accidents, acid attacks, riots, etc.

Two friends Sita and Gita, together contributed Rs. 200 towards Prime Minister's Relief Fund.

- (i) How to represent the above situation in linear equations in two variables? 1  
(ii) If Sita contributed Rs. 76 then how much was contributed by Gita? 2

**OR**

- If both contributed equally, then how much is contributed by each? 2  
(iii) Write the standard form of linear equation if  $x = -5$ ? 1

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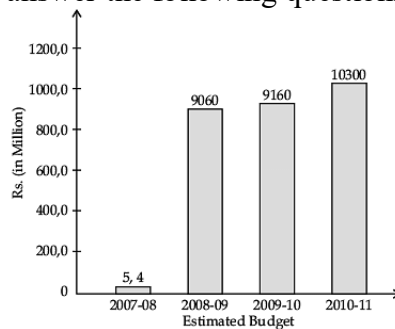
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37. Ladli Scheme was launched by the Delhi Government in the year 2008. This scheme helps to make women strong and will empower a girl child. This scheme was started in 2008.



Read the above bar graph and answer the following questions:



- (i) In which year the budget was minimum? 1  
 (ii) What is Bar-graph? 2

**OR**

- Which scheme was launched by government and in which year the budget was maximum? 2  
 (iii) What was the difference in the budget in the year 2008-2009 and 2009-10? 1

38. Isosceles triangles were used to construct a bridge in which the base (unequal side) of an isosceles triangle is 4 cm and its perimeter is 20 cm.



- (i) What will be the semi perimeter of the highlighted triangle? 1  
 (ii) What is the area of the highlighted triangle? 2

**OR**

- What will be the length of equal sides? 2  
 (iii) Which formula is used to calculate area of the triangle? 1