## **STATE LEVEL EXAM (2024 – 2025)**



### **INSTRUCTIONS TO THE STUDENT'S**

- 1. Please do not open this question paper unless you are instructed to do so.
- 2. Additional 5 minutes will be given to the candidates for filling up the student's details before the start of the competition.
- 3. The paper consists of 5 different chapters of the textbook.
- 4. All questions are compulsory and consist of equal marks.
- 5. Each question is carrying 1 mark, there is no negative marking.
- 6. There is only one correct answer, hence mark one answer only.
- 7. Darken the circle with dark pencil or blue/black ball pen only.
- 8. Return the answer sheet along with the question paper to the supervisor at the end of the exam.
- 9. Extra Blank pages can be used for rough calculations

| Name    | <br>      |
|---------|-----------|
| SCHOOL  | <br>      |
| ROLL NO | <br>CLASS |

#### **SECTION 1 - RATIO AND PROPORTION**

1. The income of two people is in the ratio of 5:3. If the first person earns ₹2500, what is the income of the second person?

A) ₹1500 B) ₹2000 C) ₹1800

2. A container has milk and water in the ratio 5:2. If the container holds 21 liters, how much milk is there?

A) 10 liters B) 15 liters C) 18 liters

3. The incomes of three people, X, Y, and Z, are in the ratio 5:6:8. If Z earns ₹4000, how much does X earn?

A) ₹2500 B) ₹3000 C) ₹3500

4. A recipe requires flour and sugar in the ratio 2:1. If 6 cups of flour are used, how much sugar is needed?

A) 2 cups B) 3 cups C) 4 cups

5. Compare the ratios 2:3 and 5:8. Which one is larger?A) 2:3B) 5:8C) Both are equal

6. The ratio of two numbers is 3:7, and of another two numbers is 5:9, which ratio is larger?A) 3:7B) 5:9C) Both are equal

7. If a and b are positive integers such that a = 2 and b = 10, compare  $\frac{a}{(b-1)}$  and  $\frac{a}{(b+1)}$ . A)  $\frac{2}{9} < \frac{2}{11}$  B)  $\frac{2}{9} > \frac{2}{11}$  C)  $\frac{2}{9} = \frac{2}{11}$ 

| A) - C = C = C = C = C = C = C = C = C = C | $B) = \frac{1}{9} - \frac{1}{11}$ | C) |
|--|-----------------------------------|----|
|  |                                   |    |

| 8. If $a = -3$ and $b = 2$ ,          | compare $\frac{a}{(b-1)}$ and $\frac{a}{(b+1)}$ . |  |
|---------------------------------------|---|--|
| $A)\frac{a}{(b-1)} < \frac{a}{(b+1)}$ | $B)\frac{a}{(b-1)} > \frac{a}{(b+1)}$             | C) $\frac{a}{(b-1)} = \frac{a}{(b+1)}$ |

9. An alloy contains copper, zinc, and nickel in the ratio 5:3:2 If the weight of the alloy is 50 kg, how much zinc does it contain?

A) 10 kg B) 20 kg C) 15 kg

10. A truck is loaded with rice, wheat, and sugar in the ratio 7:5:3 If there are 35 sacks of rice, how many sacks of sugar are there?

A) 10 sacks B) 15 sacks C) 20 sacks

11. Three gold bars weighing 12 kg, 18 kg, and 24 kg are cut into pieces in the ratio 1:2:3 What is the weight of the largest piece?

A) 8 kg B) 9 kg C) 12 kg

12. Three fruit juices, mango, orange, and pineapple, are mixed in the ratio 4:5:7. If 28 liters of mango juice is used, how much more pineapple juice than orange juice is in the mixture?

| 13. Three friends, P, 0<br>₹6,000, what is the to | Q, and R, take a loan in<br>otal interest paid by all | the ratio 3:4:5. If the interest paid by Q is three?                       |
|---|---|--|
| A) ₹16,000  | B) ₹18,000  | C) ₹20,000   |
| 14. A task is divided a complete 40% of the       | mong three workers,<br>task, what percentage          | K, Y, and Z, in the ratio 2:3:5. If X and Y together<br>is completed by Z? |
| A) 44%  | B) 32%  | C) 40%   |
| 15. In a school, the rated total number of stude  | itio of students who pr<br>ents is 720, how many      | efer Math, Science, and English is 3:4:5. If the students prefer Math?     |
| A) 150  | B) 180  | C) 160   |
| 16. Three friends, A, I                           | B, & C, share sum of ₹9                               | 0,000 in the ratio 5:3:2. How much C receive?                              |
| A) ₹15,000  | B) ₹17,000  | C) ₹18,000   |
| 17. If x is the geomet                            | ric mean of 100 and 25                                | , find the value of x.   |
| A) 50   | B) 40   | C) 35  |
| 18. If $x^2y$ , $3xy^2$ , p are i                 | in continued proportio                                | n, find the value of p.  |
| A) 6y <sup>3</sup>                                | B) 9γ <sup>3</sup>                                    | C) 12y <sup>3</sup>  |
| 19. Five numbers are                              | in continued proportio                                | on. first is 1, the last term is 625. Find numbers.                        |
| A) 1, 5, 25, 125, 62                              | 5 B) 1, 4, 16, 64                                     | , 625 C) 1, 6, 36, 216, 625  |
| 20. If 9, x, 81 are in co                         | ontinued proportion, fi                               | nd x.  |
| A) 18   | B) 27   | C) 36  |
|   |   |  |

#### **SECTION 2 - LINEAR EQUATIONS IN TWO VARIABLES**

21. Solve 2x + 2y = 10 and 3x - y = 3. What is y? A) 1 B) 2 C) 3 22. Solve x + 2y = 14 and 3x + y = 16. What is y? A) 4.5 B) 3.3 C) 5.2 23. Solve x + y = 12 and 3x + 2y = 30. What is y? A) 5 B) 6 C) 8 24. Solve x + y = 10 and 2x + 3y = 25. What is y? A) 5 C) 6 B) 7

25. A father is 30 years older than his son. Five years ago, he was four times as old as his son. What is the father's current age?

|  | A) 35 years | B) 40 years | C) 45 years |
|--|-------------|-------------|-------------|
|--|-------------|-------------|-------------|

| 26. A grandfather is f grandson's age. Wha  | ive times the age of his<br>t is the grandson's curi                      | s grandson. In 10 years, he will be three times his rent age?                                |
|---|---|--|
| A) 8 years  | B) 10 years   | C) 12 years  |
| 27. The sum of two n  | umbers is 36, one num   | ber is twice the other. What is smaller number?  |
| A) 12   | B) 18   | C) 24  |
| 28. The sum of two n  | umbers is 50. and thei  | r ratio is 3:2. What is the smaller number?  |
| A) 20   | B) 30   | C) 25  |
| 29. Difference betwe  | en reciprocals of two r   | numbers is $\frac{1}{2}$ . If one is 3, find other numbers?                                  |
| A) 4  | B) 2  | 6<br>C) 5  |
| 30. The denominator reciprocal is $\frac{5}{2}$ , what                                      | of a fraction is twice it is the fraction?                                | ts numerator. If the sum of the fraction and its   |
| A) $\frac{1}{2}$  | B) $\frac{2}{3}$  | C) $\frac{3}{4}$   |
| 31. A purse contains <sup>s</sup><br>how many ₹2 coins a                                    | ₹1 and ₹2 coins amour<br>re there?  | nting to ₹35. If the total number of coins is 20,  |
| A) 10   | B) 12   | C) 15  |
| 32. A person has ₹10<br>than the ₹5 notes, ho   | 0 in the form of ₹5 and<br>w many ₹10 notes do                            | d ₹10 notes. If the number of ₹10 notes is 4 more<br>es he have?                             |
| A) 6  | B) 8  | C) 10  |
| <ul><li>33. The diagonals of a and the other remain</li><li>A) 132 cm<sup>2</sup></li></ul> | a rhombus are 10 cm a<br>s unchanged, what is t<br>B) 120 cm <sup>2</sup> | nd 24 cm. If one diagonal is increased by 2 cm<br>the new area of the rhombus?<br>C) 144 cm² |
| 34. A square and a re<br>length of the rectang  | ctangle have the same<br>le is 25 cm, find the wi                         | e area. If the side of the square is 10 cm and the dth of the rectangle.                     |
| A) 4 cm   | B) 10 cm  | C) 40 cm   |
| 35. A person runs at a seconds?   | a speed of 10 m/s. Hov  | v much distance will the person cover in 30  |
| A) 300 m  | B) 250 m  | C) 500 m   |
| 36. A plane travels 30  | 000 km in 5 hours. Wha  | at is its speed in km/h?   |
| A) 500 km/h   | B) 600 km/h   | C) 700 km/h  |
| 37. A train travels at a  | a speed of 45 km/h for  | the first 2 hours, then at a speed of 60 km/h for  |

37. A train travels at a speed of 45 km/h for the first 2 hours, then at a speed of 60 km/h for the next 3 hours, and then at 75 km/h for the next 1 hour. What is the total distance covered by the train?

38. A man has ₹750 in the form of ₹5 and ₹20 notes. If the number of ₹5 notes is 5 more than the number of ₹20 notes, how many ₹5 notes does he have?

A) 35 B) 40 C) 34

39. A person walks to his office at a speed of 4 km/h and comes back at a speed of 6 km/h. If the total time taken for the round trip is 2 hours, what is the distance between his home and office?

A) 6.4 km B) 4.8 km C) 8.2 km

40. A person has ₹500, which is made up of ₹10 and ₹20 notes. The number of ₹20 notes is twice the number of ₹10 notes. How many ₹10 notes does he have?

A) 10 B) 15 C) 20

#### **SECTION 3 - QUADRILATERALS / CIRCLES**

41. In rectangle ABCD, diagonals AC & BD intersect at point O. If AC=8 cm, Find AO length ?A) 8 cmB) 4 cmC) 2 cm42. In rectangle ABCD, if  $\angle$ CAD = 35°, what is the value of  $\angle$ DBC?A) 55°B) 35°C) 70°

43. If diagonals of a rhombus is 20 cm & 21 cm, what is the length of half of each diagonal?A) 10 cm and 11 cmB) 10 cm and 10.5 cmC) 11 cm and 10.5 cm

44. The diagonals of a rhombus are 20 cm and 21 cm. What is the relationship between the diagonals and the side length of the rhombus?

A) The diagonals are perpendicular and bisect each other.

B) The diagonals are equal in length. C) The diagonals are not perpendicular.

45. In rhombus PQRS, if PQ = 7.5 cm and  $\angle$ QPS = 75°, what is the measure of  $\angle$ SRQ? A) 60° B) 75° C) 45°

46. In a rhombus, if one diagonal is 12 cm and other is 16 cm, find area of the rhombus?A) 75 cm<sup>2</sup>B) 60 cm<sup>2</sup>C) 96 cm<sup>2</sup>

47. In a rectangle with side lengths 7 cm & 24 cm, find the square of length of the diagonal?A) 628 cm²B) 49 cm²C) 625 cm²

48. In a rectangle, the lengths of adjacent sides are 7 cm & 24 cm. Find area of rectangle?
A) 168 cm<sup>2</sup>
B) 75 cm<sup>2</sup>
C) 120 cm<sup>2</sup>

49. The perimeter of a parallelogram is 112 cm, and the ratio of its adjacent sides is 3:4. What is the sum of the lengths of the sides of the parallelogram?

A) 112 cm B) 56 cm C) 224 cm

| 50. If the ratio of the what is the sum of the  | adjacent sides of a pa<br>ie shorter and longer s | rallelogram is 3:4, and the perimeter is 112 cm, side lengths?     |
|---|---|--|
| A) 56 cm  | B) 48 cm  | C) 64 cm   |
| 51. In rhombus PQRS                             | 5, diagonals PR = 20 cm                           | n & QS = 48 cm, find length of half of diagonal PR?                |
| A) 24 cm  | B) 12 cm  | C) 10 cm   |
| 52. In rhombus PQRS                             | s, if PR = 20 cm and QS                           | = 48 cm, what is formula for area of rhombus?                      |
| A) $\frac{1}{2}$ X PR X QS                      | B) PR X QS  | C) $\frac{1}{2}$ X PQ X QR   |
| 53. In □IJKL, side IJ                           | KL, ∠I = 108°, and ∠I                             | K = 53°. find measure of ∠L, adjacent to side KL?                  |
| A) 127°   | B) 108°   | C) 72°   |
| 54. In □IJKL, if sides<br>A) ∠I + ∠J = 180°     | IJ    KL, find the relatio<br>B) ∠I = ∠J          | onship between ∠I and ∠J along opposite sides?<br>C) ∠I + ∠J = 90° |
| 55. The radius of a ci<br>distance of the chorc | rcle is 15 cm. A chord of from the center.        | of the circle is 18 cm long. Find the perpendicular                |
| A) 8 cm   | B) 9 cm   | C) 12 cm   |
| 56. In a circle with a perpendicular distan     | radius of 25 cm, a choi<br>ce of the chord from t | rd of the circle is 40 cm long. What is the<br>he center?          |
| A) 20 cm  | B) 15 cm  | C) 12 cm   |
| 57. Circle with diame                           | eter 26 cm, length of cl                          | hord is 24 cm. Find distance of chord from center.                 |
| A) 5 cm   | B) 7 cm   | C) 3 cm  |
| 58. The diameter of a distance of the chore     | a circle is 24 cm, and th<br>I from the center?   | he length of a chord is 20 cm. What is the                         |
| A) $\sqrt{42}$ cm                               | B) $\sqrt{44}$ cm                                 | C) $\sqrt{45}$ cm  |
| 59. What is the circu                           | mference of a circle w                            | ith a diameter of 14 cm?   |
| A) 28 π cm                                      | B) 44 π cm  | C) 14 π cm   |
| 60. The diameter of a                           | a circular table is 8.4 m                         | n. Find its circumference.   |
| A) 6.39 π m                                     | B) 7.74 π m                                       | C) 8.4 π m   |
|   | SECTION 4   | - TRIGONOMETRY   |
| 61. If $\sin(\theta) = \frac{1}{2}$ , then      | n <b>cos(θ)</b> is:                               |  |
| A) $\frac{\sqrt{3}}{2}$                         | B) $\frac{1}{2}$                                  | C) $\frac{\sqrt{2}}{3}$  |
| 62. If tan(θ) = 1, wha                          | t is the value of θ?                              |  |
| A) 45°  | B) 30°  | C) 60°   |

63. If  $\sin\Theta = \frac{3}{5}$ , what is  $\cos\Theta$  assuming  $\Theta$  lies in the first quadrant? B) <sup>3</sup>/₄ A)  $\frac{1}{5}$ C)  $\frac{4}{5}$ 64. Find the value of  $\cot 45^\circ + \sin 30^\circ + \cos 60^\circ$ . A) 2 B) 1.5 C) 1 65. Evaluate  $\frac{\sin 40^{\circ}}{\cos 50^{\circ}}$ C)  $\sqrt{3}$ B) 1 A) 0.5 66. What is tan 38° · tan 52°? A) 1 C) 2 B) 0.5 67. In triangle ABC,  $\angle C = 90^{\circ}$ . If AC = 6, BC = 8, find tan A. A)  $\frac{6}{8}$ C)  $\frac{4}{3}$ B)  $\frac{3}{4}$ 68. In right-angled triangle, sides are 5, 12, 13. Find sin A if ∠A is opposite side of length 12? B)  $\frac{12}{12}$ C)  $\frac{12}{5}$ A)  $\frac{5}{12}$ 69 In triangle ABC,  $\angle B = 90^\circ$ , and  $\cos C = \frac{3}{5}$ . What is sin C? A)  $\frac{4}{5}$ B)  $\frac{3}{4}$ C)  $\frac{5}{4}$ 70. In triangle DEF,  $\angle F = 90^\circ$ , and csc  $E = \frac{13}{12}$ . What is cot E? A)  $\frac{13}{12}$ B)  $\frac{12}{5}$ C)  $\frac{5}{12}$ 71. If  $tan\Theta = \frac{8}{15}$ , find  $sec\Theta$ . A)  $\frac{15}{17}$ C)  $\frac{15}{2}$ B)  $\frac{17}{15}$ 72. If  $tan\Theta = \frac{3}{4}$ , find  $sec\Theta$ . C)  $\frac{5}{2}$ A)  $\frac{5}{4}$ B) <sup>4</sup>/<sub>-</sub> 73. If  $\cos\Theta = \frac{5}{13}$ , find  $\sin\Theta$ . C)  $\frac{13}{12}$ B)  $\frac{12}{12}$ A)  $\frac{5}{12}$ 74. If  $\cos \Theta = \frac{12}{37}$ , find  $\sin \Theta$ . A)  $\frac{12}{27}$ C)  $\frac{35}{37}$ B)  $\frac{37}{12}$ 75. In right-angled triangle PQR,  $\angle Q = 90^\circ$ , PQ = 9 cm, PR = 15 cm. Find sin P. C)  $\frac{3}{5}$ A)  $\frac{3}{4}$ B)  $\frac{4}{5}$ 

76. In right-angled triangle XYZ,  $\angle Y = 90^{\circ}$ , XY = 15 cm, YZ = 20 cm. Find sin X.

A) 
$$\frac{3}{5}$$
 B)  $\frac{4}{5}$  C)  $\frac{\sqrt{7}}{4}$ 

77. In a right-angled triangle, the sides are 16, 63, and 65. What is tan B if  $\angle$ B is opposite the side of length 63?

A)  $\frac{16}{65}$  B)  $\frac{63}{16}$  C)  $\frac{16}{63}$ 

78. In a right-angled triangle, the sides are 12, 16, and 20. What is  $\cos B$  if  $\angle B$  is opposite the side of length 16?

A)  $\frac{1}{2}$  B)  $\frac{2}{3}$  C)  $\frac{3}{5}$ 

79. In a right-angled triangle, the sides are 5, 12, and 13. What is sin B if angle B is opposite the side of length 12?

A)  $\frac{5}{12}$  B)  $\frac{12}{13}$  C)  $\frac{5}{13}$ 

80. In a right-angled triangle, the sides are 13, 84, and 85. What is cos B if angle B is opposite the side of length 84?

| A) <del>84</del> | B) <sup>13</sup> | C) $\frac{13}{13}$ |
|------------------|------------------|--------------------|
| <b>'</b> 85      | ' 84             | ° 85               |

#### **SECTION 5 - SURFACE AREA AND VOLUME**

- 81. A cone has a radius of 5 cm and a height of 12 cm. What is the volume of the cone? A)  $100\pi$  cm<sup>3</sup> B)  $150\pi$  cm<sup>3</sup> C)  $300\pi$  cm<sup>3</sup>
- 82. The volume of a cone is  $250\pi$  cm<sup>3</sup>. If the height is 15 cm, what is the radius of the cone? A)  $\sqrt{40}$  cm B)  $\sqrt{45}$  cm C)  $\sqrt{50}$  cm
- 83. A sphere has a radius of 8 cm. What is the volume of the sphere?

A)  $\frac{2048}{3} \pi \text{ cm}^3$  B)  $\frac{1024}{3} \pi \text{ cm}^3$  C)  $\frac{512}{3} \pi \text{ cm}^3$ 

84. The volume of a sphere is  $288\pi$  cm<sup>3</sup>. What is the radius of the sphere? A) 8 cm B) 7 cm C) 6 cm

85. A cone has a radius of 3 cm and a slant height of 5 cm. What is the surface area of the cone?

A) 24π cm<sup>2</sup> B) 48π cm<sup>2</sup> C) 54π cm<sup>2</sup>

86. The radius of a cone is 10 cm and its slant height is 24 cm. What is the surface area of the cone?

A)  $240 \ \pi \ cm^2$  B)  $340 \ \pi \ cm^2$  C)  $500 \ \pi \ cm^2$ 

87. The surface area of a sphere is  $400\pi$  cm<sup>2</sup>. What is the radius of the sphere?

A) 5 cm B) 12 cm C) 10 cm

| 88. A sphere has a ra                              | dius of 12 cm. What is                               | the surface area of the sphere?   |
|--|--|---|
| A) 576π cm²  | B) 432π cm²  | C) 288π cm²   |
| 89. A cylinder has a ra<br>cylinder?               | adius of 7 cm and a he                               | ight of 14 cm. What is the volume of the  |
| A) 272 π cm²                                       | B) 686 π cm²   | C) 128 π cm <sup>2</sup>  |
| 90. A cone has a radio<br>what is the ratio of th  | us of 6 cm and a slant h<br>ne surface area of the r | neight of 8 cm. If the cone's radius is halved,<br>new cone to the original cone? |
| A) 1:2   | B) 1:4   | C) 3:7  |
| 91. The surface area                               | of a sphere is 36π cm².                              | What is the radius of the sphere?   |
| A) 3 cm  | B) 6 cm  | C) 9 cm   |
| 92. The radius of a sp<br>A) 100π cm <sup>2</sup>  | here is 5 cm. If radius i<br>B) 200π cm²             | is doubled, find new surface area of the sphere? C) $400\pi$ cm <sup>2</sup>      |
| 93. The volume of a c<br>of the cone?              | one is 440π cm³. If the                              | height of the cone is 12 cm, what is the radius                                   |
| A) $\sqrt{145}$ cm                                 | B) $\sqrt{110}$ cm                                   | C) $\sqrt{140}$ cm  |
| 94. The volume of a c                              | cone is $150\pi$ cm <sup>3</sup> . If rad            | lius of the cone is 5 cm, find height of the cone?                                |
| A) 19 cm   | B) 14 cm   | C) 18 cm  |
| 95. A sphere has a ra                              | dius of 9 cm. What is tl                             | he volume of the sphere?  |
| A) 945 π cm³                                       | B) 972 π cm³   | C) 486 π cm³  |
| 96. The volume of a s                              | phere is 972 $\pi$ cm <sup>3</sup> . W               | hat is the radius of the sphere?  |
| A) 5 cm  | B) 6 cm  | C) 9 cm   |
| 97. The volume of a s                              | phere is 2304 $\pi$ cm <sup>3</sup> . V              | Vhat is the radius of the sphere?   |
| A) 12 cm   | B) 14 cm   | C) 16 cm  |
| 98. A cone has a radio<br>A) 256 π cm <sup>3</sup> | us of 9 cm and a height<br>B) 320 π cm <sup>3</sup>  | t of 16 cm. What is the volume of the cone? C) 432 π cm <sup>3</sup>              |
| 99. A cone has a volu<br>the cone?                 | me of 350π cm³. If the                               | height of the cone is 14 cm, what is the radius of                                |
| A) $\sqrt{45}$ cm                                  | B) $\sqrt{75}$ cm                                    | C) $\sqrt{90}$ cm   |
| 100. A sphere has a rasurface area?                | adius of 15 cm. If the r                             | adius is reduced by 3 cm, what is the change in                                   |
| A) 120 π cm²                                       | B) 220 π cm²   | C) 324 π cm²  |

# **ANSWER KEY**

| QUE | ANS |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1   | А   | 21  | С   | 41  | В   | 61  | А   | 81  | А   |
| 2   | В   | 22  | С   | 42  | А   | 62  | А   | 82  | С   |
| 3   | А   | 23  | В   | 43  | В   | 63  | С   | 83  | А   |
| 4   | В   | 24  | A   | 44  | А   | 64  | А   | 84  | С   |
| 5   | А   | 25  | С   | 45  | В   | 65  | В   | 85  | А   |
| 6   | В   | 26  | В   | 46  | С   | 66  | А   | 86  | В   |
| 7   | В   | 27  | А   | 47  | С   | 67  | С   | 87  | С   |
| 8   | А   | 28  | А   | 48  | А   | 68  | В   | 88  | А   |
| 9   | С   | 29  | В   | 49  | В   | 69  | А   | 89  | В   |
| 10  | В   | 30  | А   | 50  | А   | 70  | С   | 90  | В   |
| 11  | С   | 31  | С   | 51  | С   | 71  | В   | 91  | А   |
| 12  | В   | 32  | В   | 52  | А   | 72  | А   | 92  | С   |
| 13  | В   | 33  | С   | 53  | А   | 73  | В   | 93  | В   |
| 14  | С   | 34  | А   | 54  | А   | 74  | С   | 94  | С   |
| 15  | В   | 35  | А   | 55  | С   | 75  | В   | 95  | В   |
| 16  | С   | 36  | В   | 56  | В   | 76  | С   | 96  | С   |
| 17  | A   | 37  | А   | 57  | А   | 77  | В   | 97  | А   |
| 18  | В   | 38  | С   | 58  | В   | 78  | С   | 98  | С   |
| 19  | A   | 39  | В   | 59  | С   | 79  | В   | 99  | В   |
| 20  | В   | 40  | A   | 60  | С   | 80  | С   | 100 | С   |