1. If $(2000)^{10} = 1{\cdot}024 \times 10^k$, then the value of k is—
   (A) 33 (B) 30
   (C) 34 (D) 31

2. If $(10{\cdot}15)^2 = 103{\cdot}0225$, then the value of $\sqrt{1{\cdot}030225} + \sqrt{10302{\cdot}25}$ is—
   (A) 1025·15 (B) 103·515
   (C) 102·515 (D) 102·0515

3. If $\sqrt{0{\cdot}04 \times 0{\cdot}4 \times a} = 0{\cdot}004 \times 0{\cdot}4 \times \sqrt{b}$, then the value of $\frac{a}{b}$ is—
   (A) 16×10^{-3} (B) 16×10^{-4}
   (C) 16×10^{-5} (D) 16×10^{-6}

4. The smallest among $\sqrt[6]{12}, \sqrt[3]{4}, \sqrt[4]{5}, \sqrt{3}$ is—
   (A) $\sqrt[6]{12}$ (B) $\sqrt[3]{4}$
   (C) $\sqrt{3}$ (D) $\sqrt[4]{5}$

5. When a number is divided by 36, the remainder is 19. What will be the remainder when the number is divided by 12 ?
   (A) 7 (B) 5
   (C) 3 (D) 0

6. Rani's weight is 25% that of Meena's and 40% that of Tara's. What percentage of Tara's weight is equal to Meena's weight ?
   (A) 160% (B) 140%
   (C) 120% (D) 100%

7. Out of 2500 people, only 60% have the saving habit. If 30% save with bank, 32% with post office and the rest with shares, the number of shareholders are—
   (A) 450 (B) 570
   (C) 950 (D) 1250

8. A person bought 50 pens for ₹ 50 each. He sold 40 of them at a loss of 5%. He wants to gain 10% on the whole. Then his gain per cent on the remaining pens should be—
   (A) 15 (B) 40
   (C) 50 (D) 70

9. By selling 60 articles a vendor gains the selling price of 15 articles. Find his gain percentage.
   (A) 25 (B) $33\frac{1}{3}$
   (C) 20 (D) $28\frac{4}{7}$

10. A shopkeeper marks an article at ₹ 60 and sells it at a discount of 15%. He also gives a gift worth ₹ 3. If he still makes 20% profit, the cost price, in rupees, is—
    (A) 22 (B) 32
    (C) 40 (D) 42

11. On a certain sum of money lent out at 16% p.a. the difference between the compound interest for 1 year, payable half yearly, and the simple interest for 1 year is ₹ 56. The sum is—
    (A) ₹ 1080 (B) ₹ 7805
    (C) ₹ 8750 (D) ₹ 5780

12. On a certain sum, the simple interest at the end of $6\frac{1}{4}$ years becomes $\frac{3}{8}$ of the sum. The rate of interest is—
    (A) 5% (B) 6%
    (C) 7% (D) 8%

13. A shopkeeper lists the price of an article as ₹ 500. But he gives a certain discount which allows the buyer to pay ₹ 500 for the article including 10% sales tax. The rate of discount is—
    (A) 10% (B) $10\frac{1}{11}\%$
    (C) $9\frac{1}{11}\%$ (D) 11%

14. After allowing a discount of 16%, there was still a gain of 5%. Then the percentage of marked price over the cost price is—
    (A) 15% (B) 18%
    (C) 21% (D) 25%

15. Mean of 10 numbers is 30. Later on it was observed that numbers 15, 23 are wrongly taken as 51, 32. The correct mean is—
    (A) 25·5 (B) 32
    (C) 30 (D) 34·5

16. Of the three numbers, the first number is twice of the second and the second is thrice of the third number. If the average of these 3 numbers is 20, then the sum of the largest and smallest numbers is—
    (A) 24 (B) 42
    (C) 54 (D) 60

17. The average of the three numbers x, y and z is 45. x is greater than the average of y and z by 9. The average of y and z is greater than y by 2. Then the difference of x and z is—
    (A) 3 (B) 5
    (C) 7 (D) 11

18. If $x : y = 3 : 4$, $4x + 5y : 5x - 2y =$
    (A) 7 : 32 (B) 32 : 7
    (C) 4 : 3 (D) 5 : 2

19. The incomes of A and B are in the ratio 2 : 3 and their expenditures are in the ratio 1 : 2. If each saves ₹ 24,000, find A's income—
    (A) ₹ 24,000 (B) ₹ 72,000
    (C) ₹ 19,200 (D) ₹ 48,000

20. In a mixture of 25 litres, the ratio of acid to water is 4 : 1. Another 3 litres of water is added to the mixture. The ratio of acid to water in the new mixture is—
    (A) 5 : 2 (B) 2 : 5
    (C) 3 : 5 (D) 5 : 3

21. A and B working together, can do a piece of work in $4\frac{1}{2}$ hour. B and C working together can do it in 3 hours. C and A working together can do it in $2\frac{1}{4}$ hour. All of them begin the work at the

same time. Find how much time they will take to finish the piece of work—

(A) 3 hour

(B) 2 hour

(C) 2·5 hour

(D) 3·25 hour

22. Pipes P and Q can fill a tank in 10 and 12 hours respectively and C can empty it in 6 hours. If all the three are opened at 7 a.m., at what time will one-fourth of the tank be filled ?

(A) 10 a.m. (B) 10 p.m.

(C) 11 p.m. (D) 11 a.m.

23. A and B together can do $\frac{11}{19}$ of a work. In the same time B and C together can do $\frac{14}{19}$ of the same work. The ratio of work done by A, B and C is—

(A) 3 : 4 : 5 (B) 4 : 5 : 7

(C) 5 : 6 : 8 (D) 5 : 7 : 8

24. The speed of the current is 5 km/hour. A motorboat goes 10 km upstream and back again to the starting point in 50 minute. The speed, in km/hour, of the motorboat in still water is—

(A) 20 (B) 26

(C) 25 (D) 28

25. A man has to be at a certain place at a certain time. He finds that he shall be 20 minute late if he walks at 3 km/h speed and 10 minutes earlier if he walks at a speed of 4 km/h. The distance he has to walk is—

(A) 24 km (B) 12·5 km

(C) 10 km (D) 6 km

26. If the sum of three dimensions and the total surface area of a rectangular box are 12 cm and 94 cm^2 respectively, then the maximum length of a stick that can be placed inside the box is—

(A) $5\sqrt{2}$ cm (B) 5 cm

(C) 6 cm (D) $2\sqrt{5}$ cm

27. Each interior angle of a regular polygon is 18° more than eight times an exterior angle. The number of sides of the polygon is—

(A) 10 (B) 15

(C) 20 (D) 25

28. The radius of the incircle of a triangle is 2 cm. If the area of the triangle is 6 cm^2, then its perimeter is—

(A) 2 cm (B) 3 cm

(C) 6 cm (D) 9 cm

29. The total surface area of a solid right circular cylinder is twice that of a solid sphere. If they have the same radii, the ratio of the volume of the cylinder to that of the sphere is given by—

(A) 9 : 4 (B) 2 : 1

(C) 3 : 1 (D) 4 : 9

30. The base of a solid right prism is a triangle whose sides are 9 cm, 12 cm and 15 cm. The height of the prism is 5 cm. Then, the total surface area of the prism is—

(A) 180 cm^2 (B) 234 cm^2

(C) 288 cm^2 (D) 270 cm^2

31. If the sum of $\frac{a}{b}$ and its reciprocal is 1 and $a \neq 0$, $b \neq 0$, then the value of $a^3 + b^3$ is—

(A) 2 (B) -1

(C) 0 (D) 1

32. If $x^2 + y^2 + \frac{1}{x^2} + \frac{1}{y^2} = 4$, then the value of $x^2 + y^2$ is—

(A) 2 (B) 4

(C) 8 (D) 16

33. If $x^2 = y + z$, $y^2 = z + x$, $z^2 = x + y$, then the value of $\frac{1}{x+1} + \frac{1}{y+1} + \frac{1}{z+1}$ is—

(A) -1 (B) 1

(C) 2 (D) 4

34. If $x + \frac{1}{x} = \sqrt{3}$, then the value of $x^{18} + x^{12} + x^6 + 1$ is—

(A) 0 (B) 1

(C) 2 (D) 3

35. If $a^2 + b^2 = 2$ and $c^2 + d^2 = 1$, then the value of $(ad - bc)^2 + (ac + bd)^2$ is—

(A) $\frac{4}{9}$ (B) $\frac{1}{2}$

(C) 1 (D) 2

36. Two medians AD and BE of Δ ABC intersect at G at right angles. If AD = 9 cm and BE = 6 cm, then the length of BD, in cm, is—

(A) 10 (B) 6

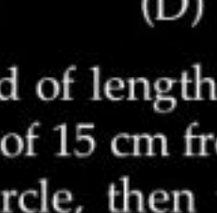
(C) 5 (D) 3

37. The length of each side of an equilateral triangle is $14\sqrt{3}$ cm. The area of the in-circle, in cm^2, is—

(A) 450 (B) 308

(C) 154 (D) 77

38. Three circles of diameter 10 cm each, are bound together by a rubber band, as shown in the figure.



The length of the rubber band, in cm, if it is stretched as shown, is—

(A) 30 (B) $30 + 10\pi$

(C) 10π (D) $60 + 20\pi$

39. The ratio of the areas of two isosceles triangles having the same vertical angle (*i.e.*, angle between equal sides) is 1 : 4. The ratio of their heights is—

(A) 1 : 4 (B) 2 : 5

(C) 1 : 2 (D) 3 : 4

40. If a chord of length 16 cm is at a distance of 15 cm from the centre of the circle, then the length of the chord of the same circle which is at a distance of 8 cm from the centre is equal to—

(A) 10 cm (B) 20 cm

(C) 30 cm (D) 40 cm

41. The minimum value of $2\sin^2\theta + 3\cos^2\theta$ is—

(A) 0 (B) 3

(C) 2 (D) 1

42. The value of $\tan 4° \cdot \tan 43° \cdot \tan 47° \cdot \tan 86°$ is—

(A) 2 (B) 3

(C) 1 (D) 4

43. If $\frac{\tan\theta + \cos\theta}{\tan\theta - \cot\theta} = 2$, $(0 \leq \theta \leq 90°)$, then the value of $\sin\theta$ is—

(A) $\frac{2}{\sqrt{3}}$ (B) $\frac{\sqrt{3}}{2}$

(C) $\frac{1}{2}$ (D) 1

44. If the angle of elevation of the Sun changes from 30° to 45°, the length of the shadow of a pillar decreases by 20 metre. The height of the pillar is—

(A) $20\left(\sqrt{3}-1\right)$ m

(B) $20\left(\sqrt{3}+1\right)$ m

(C) $10\left(\sqrt{3}-1\right)$ m

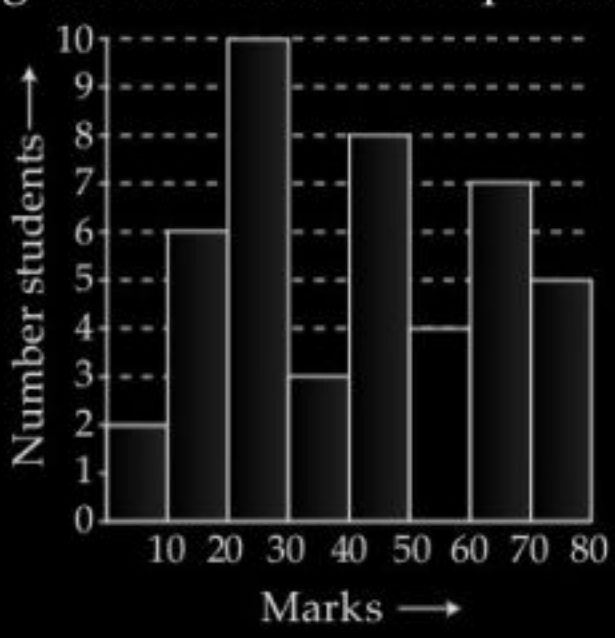
(D) $10\left(\sqrt{3}+1\right)$ m

45. If $\operatorname{cosec} 39° = x$, the value of $\frac{1}{\operatorname{cosec}^2 51°} + \sin^2 39° + \tan^2 51° - \frac{1}{\sin^2 51° \sec^2 39°}$ is—

(A) $\sqrt{x^2-1}$ (B) $\sqrt{1-x^2}$

(C) x^2-1 (D) $1-x^2$

Directions—(Q. 46–50) The histogram shows the marks obtained by 45 students of a class. Look at the histogram and answer the questions.



46. How many students have obtained marks less than 10 ?

(A) 2 (B) 10

(C) 1 (D) 4

47. How many students have obtained 30 or more marks but less than 40 ?

(A) 3 (B) 4

(C) 5 (D) 6

48. How many students have obtained marks 50 and above ?

(A) 9 (B) 10

(C) 11 (D) 16

49. If the pass mark be 30, what is the number of failures ?

(A) 2 (B) 6

(C) 18 (D) 20

50. If the pass mark be 30, what is the percentage of successful students ?

(A) 75% (B) 60%

(C) 50% (D) 40%