

CAT 2024 QA Question Paper PDF (November 24, 2024) (Shift 3)

1. In a group of 250 students, the percentage of girls was at least 44% and at most 60%. The rest of the students were boys. Each student opted for either swimming or running or both. If 50% of the boys and 80% of the girls opted for swimming while 70% of the boys and 60% of the girls opted for running, then the minimum and maximum possible number of students who opted for both swimming and running, are:

- A. 72 and 88, respectively
- B. 75 and 96, respectively
- C. 72 and 80, respectively
- D. 75 and 90, respectively

2. If $(a + b\sqrt{3})^2 = 52 + 30\sqrt{3}$, where a and b are natural numbers, then $a + b$ equals:

- A. 7
- B. 8
- C. 9
- D. 10

3. The average of three distinct real numbers is 28. If the smallest number is increased by 7 and the largest number is reduced by 10, the order of the numbers remains unchanged, and the new arithmetic mean becomes 2 more than the middle number, while the difference between the largest and the smallest numbers becomes 64. Then, the largest number in the original set of three numbers is:

4. If 10^{68} is divided by 13, the remainder is:

- A. 5
- B. 8
- C. 9
- D. 4

5. Sam can complete a job in 20 days when working alone. Mohit is twice as fast as Sam and thrice as fast as Ayna in the same job. They undertake a job with an arrangement where Sam and Mohit work together on the first day, Sam and Ayna on the second day, Mohit and Ayna on the third day, and this three-day pattern is repeated till the work gets completed. Then, the fraction of total work done by Sam is:

- A. $\frac{1}{20}$

B. $3/10$

C. $1/5$

D. $3/20$

6. A circular plot of land is divided into two regions by a chord of length $10\sqrt{3}$ meters such that the chord subtends an angle of 120° at the center. Then, the area, in square meters, of the smaller region is:

A. $20(4\pi/3 + \sqrt{3})$

B. $25(4\pi/3 + \sqrt{3})$

C. $20(4\pi/3 - \sqrt{3})$

D. $25(4\pi/3 - \sqrt{3})$

7. Consider the sequence $t_1 = 1$, $t_2 = -1$ and $t_n = ((n-3)/(n-1))t_{n-2}$ for $n \geq 3$. Then, the value of the sum $1/t_2 + 1/t_4 + 1/t_6 + \dots + 1/t_{2022} + 1/t_{2024}$ is:

A. -1024144

B. -1022121

C. -1023132

D. -1026169

8. The number of distinct real values of x , satisfying the equation $\max\{x, 2\} - \min\{x, 2\} = |x + 2| - |x - 2|$, is:

9. Aman invests Rs. 4000 in a bank at a certain rate of interest, compounded annually. If the ratio of the value of the investment after 3 years to the value of the investment after 5 years is $25 : 36$, then the minimum number of years required for the value of the investment to exceed Rs. 20000 is:

10. The sum of all distinct real values of x that satisfy the equation $10^x + 4/10^x = 81/2$, is:

A. $2\log_{10}2$

B. $4\log_{10}2$

C. $\log_{10}2$

D. $3\log_{10}2$

11. A train travelled a certain distance at a uniform speed. Had the speed been 6 km per hour more, it would have needed 4 hours less. Had the speed been 6 km per hour less, it would have needed 6 hours more. The distance, in km, travelled by the train is:

- A. 720
- B. 800
- C. 780
- D. 640

12. If $3^a = 4$, $4^b = 5$, $5^c = 6$, $6^d = 7$, $7^e = 8$ and $8^f = 9$, then the value of the product $abcdef$ is:

13. Gopi marks a price on a product in order to make 20% profit. Ravi gets 10% discount on this marked price, and thus saves Rs. 15. Then, the profit, in rupees, made by Gopi by selling the product to Ravi, is:

- A. 10
- B. 25
- C. 15
- D. 20

14. A certain amount of water was poured into a 300 litre container and the remaining portion of the container was filled with milk. Then an amount of this solution was taken out from the container which was twice the volume of water that was earlier poured into it, and water was poured to refill the container again. If the resulting solution contains 72% milk, then the amount of water, in litres, that was initially poured into the container was:

15. A regular octagon ABCDEFGH has sides of length 6 cm each. Then the area, in sq. cm, of the square ACEG is:

- A. $72(2 + \sqrt{2})$
- B. $36(1 + \sqrt{2})$
- C. $72(1 + \sqrt{2})$
- D. $36(2 + \sqrt{2})$

16. The number of distinct integer solutions (x, y) of the equation $|x + y| + |x - y| = 2$, is:

17. For any non-zero real number x , let $f(x) + 2f(1/x) = 3x$. Then, the sum of all possible values of x for which $f(x) = 3$, is:

- A. 3
- B. -2
- C. -3
- D. 2

18. For some constant real numbers p , k and a , consider the following system of linear equations in x and y :

$$px - 4y = 2$$

$$3x + ky = a$$

A necessary condition for the system to have no solution for (x, y) , is:

- A. $ap + 6 = 0$
- B. $2a + k \neq 0$
- C. $ap - 6 = 0$
- D. $kp + 12 \neq 0$

19. Rajesh and Vimal own 20 hectares and 30 hectares of agricultural land, respectively, which are entirely covered by wheat and mustard crops. The cultivation area of wheat and mustard in the land owned by Vimal are in the ratio 5 : 3. If the total cultivation area of wheat and mustard are in the ratio 11 : 9, then the ratio of cultivation area of wheat and mustard in the land owned by Rajesh is:

- A. 4 : 3
- B. 7 : 9
- C. 3 : 7
- D. 1 : 1

20. The midpoints of sides AB , BC , and AC in $\triangle ABC$ are M , N , and P , respectively. The medians drawn from A , B , and C intersect the line segments MP , MN and NP at X , Y , and Z , respectively. If the area of $\triangle ABC$ is 1440 sq. cm, then the area, in sq. cm, of $\triangle XYZ$ is:

21. The number of all positive integers up to 500 with non-repeating digits is:

22. After two successive increments, Gopal's salary became 187.5% of his initial salary. If the percentage of salary increase in the second increment was twice of that in the first increment, then the percentage of salary increase in the first increment was:

- A. 30
- B. 27.5
- C. 25
- D. 20