

CAT 2020 QA Question Paper PDF (November 29, 2020) (Shift 3)

1. Two alcohol solutions, A and B, are mixed in the proportion 1 : 3 by volume. The volume of the mixture is then doubled by adding solution A such that the resulting mixture has 72% alcohol. If solution A has 60% alcohol, then the percentage of alcohol in solution B is:

- A. 90%
- B. 94%
- C. 92%
- D. 89%

2. A batsman played $n + 2$ innings and got out on all occasions. His average score in these $n + 2$ innings was 29 runs and he scored 38 and 15 runs in the last two innings. The batsman scored less than 38 runs in each of the first n innings. In these n innings, his average score was 30 runs and lowest score was x runs. The smallest possible value of x is:

- A. 4
- B. 3
- C. 2
- D. 1

3. Let m and n be positive integers. If $x^2 + mx + 2n = 0$ and $x^2 + 2nx + m = 0$ have real roots, then the smallest possible value of $m + n$ is:

- A. 7
- B. 6
- C. 8
- D. 5

4. A contractor agreed to construct a 6 km road in 200 days. He employed 140 persons for the work. After 60 days, he realized that only 1.5 km of road has been completed. How many additional people would he need to employ in order to finish the work exactly on time?

5. If $x_1 = -1$ and $x_m = x_{m+1} + (m + 1)$ for every positive integer m , then x_{100} equals:

- A. -5050
- B. -5151
- C. -5051
- D. -5150

6. If $\log_a 30 = A$, $\log_a(5/3) = -B$ and $\log_2 a = 1/3$, then $\log_3 a$ equals:

- A $\frac{2}{A+B-3}$
- B $\frac{2}{A+B} - 3$
- C $\frac{A+B}{2} - 3$
- D $\frac{A+B-3}{2}$

7. Dick is thrice as old as Tom and Harry is twice as old as Dick. If Dick's age is 1 year less than the average age of all three, then Harry's age, in years, is:

8. Vimla starts for office every day at 9 am and reaches exactly on time if she drives at her usual speed of 40 km/hr. She is late by 6 minutes if she drives at 35 km/hr. One day, she covers two-thirds of her distance to office in one-third of her usual total time to reach office, and then stops for 8 minutes. The speed, in km/hr, at which she should drive the remaining distance to reach office exactly on time is:

- A. 29
- B. 26
- C. 28
- D. 27

9. Let m and n be natural numbers such that n is even and $0.2 < m/20$, n/m , $n/11 < 0.5$. Then $m - 2n$ equals:

- A. 3
- B. 1
- C. 2
- D. 4

10. How many integers in the set $\{100, 101, 102, \dots, 999\}$ have at least one digit repeated?

11. In the final examination, Bishnu scored 52% and Asha scored 64%. The marks obtained by Bishnu are 23 less, and those obtained by Asha are 34 more than the marks obtained by Ramesh. The marks obtained by Geeta, who scored 84%, are:

- A. 357
- B. 417
- C. 439
- D. 399

12. If a, b, c are non-zero and $14^a = 36^b = 84^c$, then $6b(1/c - 1/a)$ is equal to:

13. A person invested a certain amount of money at 10% annual interest, compounded half-yearly. After one and a half years, the interest and principal together became Rs. 18522. The amount, in rupees, that the person had invested is:

14. A man buys 35 kg of sugar and sets a marked price in order to make a 20% profit. He sells 5 kg at this price and 15 kg at a 10% discount. Accidentally, 3 kg of sugar is wasted. He sells the remaining sugar by raising the marked price by p percent so as to make an overall profit of 15%. Then p is nearest to:

- A. 22
- B. 35
- C. 25
- D. 31

15. The points $(2, 1)$ and $(-3, -4)$ are opposite vertices of a parallelogram. If the other two vertices lie on the line $x + 9y + c = 0$, then c is:

- A. 12
- B. 13
- C. 15
- D. 14

16. A and B are two railway stations 90 km apart. A train leaves A at 9:00 am, heading towards B at a speed of 40 km/hr. Another train leaves B at 10:30 am, heading towards A at a speed of 20 km/hr. The trains meet each other at:

- A. 11:45 am
- B. 11:20 am
- C. 11:00 am
- D. 10:45 am

17. Let N , x and y be positive integers such that $N = x + y$, $2 < x < 10$, $14 < y < 23$. If $N > 25$, then how many distinct values are possible for N ?
18. Let k be a constant. The equations $kx + y = 3$ and $4x + ky = 4$ have a unique solution if and only if:
- A. $|k| \neq 2$
 - B. $|k| = 2$
 - C. $k \neq 2$
 - D. $k = 2$
19. How many of the integers 1, 2, ..., 120 are divisible by none of 2, 5 and 7?
- A. 42
 - B. 41
 - C. 40
 - D. 43
20. How many pairs (a, b) of positive integers are there such that $a \leq b$ and $ab = 4^{2017}$?
- A. 2018
 - B. 2019
 - C. 2017
 - D. 2020
21. Anil, Sunil and Ravi run along a circular path of length 3 km, starting from the same point at the same time, and going in the clockwise direction. If they run at speeds of 15 km/hr, 10 km/hr and 8 km/hr, respectively, how much distance, in km, will Ravi have run when Anil and Sunil meet again for the first time at the starting point?
- A. 4.8
 - B. 4.6
 - C. 5.2
 - D. 4.2
22. In a trapezium ABCD, AB is parallel to DC, BC is perpendicular to DC and $\angle BAD = 45^\circ$. If DC = 5 cm and BC = 4 cm, the area of the trapezium, in sq cm, is:

23. The area, in sq units, enclosed by the lines $x = 2$, $y = |x - 2| + 4$, the X-axis and the Y-axis is equal to:

- A. 10
- B. 6
- C. 8
- D. 12

24. If $f(x + y) = f(x)f(y)$ and $f(5) = 4$, then $f(10) - f(-10)$ is equal to:

- A. 14.0625
- B. 0
- C. 15.9375
- D. 3

25. The value of

$$\frac{2 \times 4 \times 8 \times 16}{(\log_2 4)^2 (\log_4 8)^3 (\log_8 16)^4}$$

equals:

26. The vertices of a triangle are $(0, 0)$, $(4, 0)$ and $(3, 9)$. The area of the circle passing through these three points is:

- A. $14\pi/3$
- B. $123\pi/7$
- C. $12\pi/5$
- D. $205\pi/9$