CAT 2022 QA Slot 3 Question Paper

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General Instructions

(i) This question paper contains 20 questions. All questions are compulsory.

(ii) It comprises 13 single-correct multiple-choice questions and 7 numerical / type-in-the-answer questions.

(iii) Attempt every question; detailed solutions are provided in the companion solutions booklet.

(iv) For numerical questions, report the answer rounded exactly as asked.

1. A donation box can receive only cheques of ₹100,₹250 and ₹500. On one good day,the donation box was found to contain exactly 100 cheques amounting to a total sum of ₹15250. Then, the maximum possible number of cheques of ₹500 that the donation box may have contained,is

2. If $c = \frac{16x}{y} + \frac{49y}{x}$ for some non-zero real numbers x and y,then c cannot take the value

(A) -70

(B) -50

(C) 60

(D) -60

3. If $(3 + 2\sqrt{2})$ is a root of the equation ax2 + bx + c = 0 and $(4 + 2\sqrt{3})$ is a root of the equation ay^2 + my + n = 0,where a,b,c,m and n are integers, then the value of $(\frac{b}{m} + \frac{c-2b}{n})$ is

(A) 3

(B) 1

(C) 4

(D) 0

4. Suppose the medians BD and CE of a triangle ABC intersect at a point O. If area of triangle ABC is 108 sq. cm, then, the area of the triangle EOD, in sq. cm, is

5. Bob can finish a job in 40 days,if he works alone. Alex is twice as fast as Bob and thrice as fast as Cole in the same job.Suppose Alex and Bob work together on the first day,Bob and Cole work together on the second day,Cole and Alex work together on the third day and then,they continue the work by repeating this three-day roster,with Alex and Bob working together on the fourth day and so on.Then,the total number of days Alex would have worked when the job gets finished,is

6. A glass contains 500cc of milk and a cup contains 500cc of water.From the glass,150cc of milk is transferred to the cup and mixed thoroughly. Next,150cc of this mixture is transferred from the cup to the glass.Now,the amount of water in the glass and the amount of milk in the cup are in the ratio

(A) 3\ratio10

(B) 10\ratio3

(C) 1\ratio1

(D) 10\ratio13

7. Consider six distinct natural numbers such that the average of the two smallest numbers is 14 and the average of the two largest numbers is 28. Then,the maximum possible value of the average of these six numbers is

(A) 22.5

(B) 23.5

(C) 24

(D) 23

8. Let r be a real number and $f(x) = \begin{cases} 2x - r & \text{if } x \geq r \\ r & \text{if } x < r \end{cases}$.Then, the equation $f(x) = f(f(x))$ holds for all real values of x where

(A) $x \leq r$

(B) $x \geq r$

(C) $x > r$

(D) $x \neq r$

9. Two ships are approaching a port along straight routes at constant speeds. Initially,the two ships and the port formed an equilateral triangle with sides of length 24 km. When the slower ship travelled 8 km,the triangle formed by the new positions of the two ships and the port became right-angled. When the faster ship reaches the port, the distance,in km,between the other ship and the port will be

(A) 4

(B) 6

(C) 12

(D) 8

10. Nitu has an initial capital of ₹20,000.Out of this,she invests ₹8,000 at 5.5% in bank A,₹5,000 at 5.6% in bank B and the remaining amount at $x\%$ in bank C,each rate being simple interest per annum.Her combined annual interest income from these investments is equal to 5% of the initial capital. If she had invested her entire initial capital in bank C alone,then her annual interest income,in rupees,would have been

(A) 900

(B) 700

(C) 1000

(D) 800

11. The minimum possible value of $\frac{x^2-6x+10}{3-x}$,for x<3,is

(A) $\frac{1}{2}$

(B) $-\frac{1}{2}$

(C) 2

(D) -2

12. In an examination,the average marks of students in sections A and B are 32 and 60,respectively. The number of students in section A is 10 less than that in section B. If the average marks of all the students across both

the sections combined is an integer,then the difference between the maximum and minimum possible number of students in section A is

13. If $\left(\frac{\sqrt{7}}{5}\right)^{3x-y} = \frac{875}{2401}$ and $\left(\frac{4a}{b}\right)^{6x-y} = \left(\frac{2a}{b}\right)^{y-6x}$, for all non-zero real values of a and b,then the value of x+y is

14. A group of N people worked on a project.They finished **35%** of the project by working 7 hours a day for 10 days.Thereafter,10 people left the group and the remaining people finished the rest of the project in 14 days by working 10 hours a day.Then the value of N is

(A) 23

(B) 140

(C) 36

(D) 150

15. Moody takes 30 seconds to finish riding an escalator if he walks on it at his normal speed in the same direction.He takes 20 seconds to finish riding the escalator if he walks at twice his normal speed in the same direction.If Moody decides to stand still on the escalator,then the time,in seconds,needed to finish riding the escalator is

16. Suppose k is any integer such that the equation $2x^2 + kx + 5 = 0$ has no real roots and the equation $x^2 + (k-5)x + 1 = 0$ has two distinct real roots for x. Then, the number of possible values of k is

(A) 7

(B) 8

(C) 9

(D) 13

17. The arithmetic mean of all the distinct numbers that can be obtained by rearranging the digits in 1421, including itself, is

(A) 2442

(B) 2222

(C) 3333

(D) 2592

18. The lengths of all four sides of a quadrilateral are integer valued.If three of its sides are of length 1cm,2cm and 4cm,then the total number of possible lengths of the fourth side is

(A) 6

(B) 4

(C) 5

(D) 3

19. Two cars travel from different locations at constant speeds. To meet each other after starting at the same time, they take 1.5 hours if they travel towards each other, but 10.5 hours if they travel in the same direction. If the speed of the slower car is 60km/hr, then the distance traveled, in km,

by the slower car when it meets the other car while traveling towards each other, is

(A) 150

(B) 100

(C) 90

(D) 120

20. The average of all 3-digit terms in the arithmetic progression 38,55,72,...,is