oliveboard

CAT 2022

Question Paper

(Slot 1, 2, and 3)

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CAT Quants (Slot 1)

Question 1- Let ABCD be a parallelogram such that the coordinates of its three vertices A, B, C are (1, 1), (3, 4), and (−2, 8), respectively. Then, the coordinates of the vertex D are

A. (−4, 5)
B. (4, 5)
C. (−3, 4)
D. (0, 11)

Question 2- The number of ways of distributing 20 identical balloons among 4 children such that each child gets some balloons but no child gets an odd number of balloons, is

Question 3- A mixture contains lemon juice and sugar syrup in equal proportion. If a new mixture is created by adding this mixture and sugar syrup in the ratio 1 : 3, then the ratio of lemon juice and sugar syrup in the new mixture is

A. 1 : 6
B. 1 : 4
C. 1 : 5
D. 1 : 7

Question 4- For natural numbers x,y, and z, if xy+yz=19 and yz+xz=51, then the minimum possible value of xyz is

Question 5- Let a,b,c be non-zero real numbers such that b2<4ac, and f(x)=ax2+bx+c. If the set S consists of all integers m such that f(m)<0, then the set S must necessarily be

A. the set of all integers
B. either the empty set or the set of all integers
C. the empty set
D. the set of all positive integers

Question 6- Trains A and B start traveling at the same time towards each other with constant speeds from stations X and Y, respectively. Train A reaches station Y in 10 minutes while train B takes 9 minutes to reach station X after meeting train A. Then the total time taken, in minutes, by train B to travel from station Y to station X is

A. 15
B. 12
C. 6
D. 10

Question 7- The average of three integers is 13 . When a natural number n is included, the average of these four integers remains an odd integer. The minimum possible value of n is

A. 3
B. 4
C. 5
D. 1

Question 8- Pinky is standing in a queue at a ticket counter. Suppose the ratio of the number of persons standing ahead of Pinky to the number of persons standing behind her in the queue is 3 : 5. If the total number of persons in the queue is less than 300, then the maximum possible number of persons standing ahead of Pinky is

Question 9- Ankita buys 4 kg cashews, 14 kg peanuts, and 6 kg almonds when the cost of 7 kg cashews is the same as that of 30 kg peanuts or 9 kg almonds. She mixes all three nuts and marks a price for the mixture in order to make a profit of ₹1752. She sells 4 kg of the mixture at this marked price and the remaining at a 20% discount on the marked price, thus making a total profit of ₹744. Then the amount, in rupees, that she had spent buying almonds is

A. 1440
B. 1176
C. 1680
D. 2520

Question 10- The largest real value of a for which the equation $|x+a|+|x-1|=2$ has an infinite number of solutions for x is

A. -1
B. 0
C. 1
D. 2

Question 11- A trapezium ABCD has side AD parallel to BC, $\angle BAD=90^{\circ}$, BC=3~cm, and AD=8~cm. If the perimeter of this trapezium is 36~cm, then its area, in sq. cm, is

Question 12- For any real number x, let [x] be the largest integer less than or equal to x. If ∑Nn=1[15+n25]=25 then N is

Question 13- In a village, the ratio of number of males to females is 5 : 4. The ratio of number of literate males to literate females is 2 : 3. The ratio of the number of illiterate males to illiterate females is 4 : 3. If 3600 males in the village are literate, then the total number of females in the village is

Question 14- Amal buys 110 kg of syrup and 120 kg of juice, syrup being 20% less costly than juice, per kg. He sells 10 kg of syrup at 10% profit and 20 kg of juice at 20% profit. Mixing the remaining juice and syrup, Amal sells the mixture at ₹ 308.32

per kg and makes an overall profit of 64%. Then, Amal's cost price for syrup, in rupees per kg, is

Question 15- Let a and b be natural numbers. If a2+ab+a=14 and b2+ab+b=28, then (2a+b) equals

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

Question 16- Alex invested his savings in two parts. The simple interest earned on the first part at 15% per annum for 4 years is the same as the simple interest earned on the second part at 12% per annum for 3 years. Then, the percentage of his savings invested in the first part is

A. 62.5%
B. 37.5%
C. 60%
D. 40%

Question 17- In a class of 100 students, 73 like coffee, 80 like tea, and 52 like lemonade. It may be possible that some students do not like any of these three drinks. Then the difference between the maximum and minimum possible number of students who like all the three drinks is

A. 48
B. 53
C. 47
D. 52

Question 18- For any natural number n, suppose the sum of the first n terms of an arithmetic progression is (n+2n2). If the nth term of the progression is divisible by 9, then the smallest possible value of n is

A. 4
B. 8
C. 7
D. 9

Question 19- All the vertices of a rectangle lie on a circle of radius R. If the perimeter of the rectangle is P, then the area of the rectangle is

A. P2/2−2PR
B. P2/8−2R2
C. P2/16−R2
D. P2/8−R2/2

Question 20- The average weight of students in a class increases by 600 gm when some new students join the class. If the average weight of the new students is 3 kg more than the average weight of the original students, then the ratio of the number of original students to the number of new students is

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

Question 21- Let A be the largest positive integer that divides all the numbers of form 3k+4k+5k, and B be the largest positive integer that divides all the numbers of the form 4k+3(4k)+4k+2, where k is any positive integer. Then (A+B) equals

Question 22- Let 0≤a≤x≤100 and f(x)=|x−a|+|x−100|+|x−a−50|. Then the maximum value of f(x) becomes 100 when a is equal to

A. 100
B. 25
C. 0
D. 50

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Question Paper Slot 2

CAT Quants (Slot 2)

Question 1- In triangle ABC, altitudes AD and BE are drawn to the corresponding bases. If ∠BAC=45◦ and ∠ABC=θ, then ADBE equals

A. 2√sinθ
B. 2√cosθ
C. (sinθ+cosθ)/2√
D. 1

Question 2- Working alone, the times taken by Anu, Tanu and Manu to complete any job are in the ratio 5 : 8 : 10. They accept a job which they can finish in 4 days if they all work together for 8 hours per day. However, Anu and Tanu work together for the first 6 days, working 6 hours 40 minutes per day. Then, the number of hours that Manu will take to complete the remaining job working alone is

Question 3- Regular polygons A and B have number of sides in the ratio 1 : 2 and interior angles in the ratio 3 : 4. Then the number of sides of B equals

Question 4- If a and b are non-negative real numbers such that a+2b=6, then the average of the maximum and minimum possible values of (a+b) is

A. 4
B. 4.5
C. 3.5
D. 3

Question 5- Manu earns ₹4000 per month and wants to save an average of ₹550 per month in a year. In the first nine months, his monthly expense was ₹3500, and he foresees that, tenth month onward, his monthly expense will increase to ₹3700. In order to meet his yearly savings target, his monthly earnings, in rupees, from the tenth month onward should be

A. 4200
B. 4400
C. 4300
D. 4350

Question 6- There are two containers of the same volume, first container half-filled with sugar syrup and the second container half-filled with milk. Half the content of the first container is transferred to the second container, and then the half of this mixture is transferred back to the first container. Next, half the content of the first container is transferred back to the second container. Then the ratio of sugar syrup and milk in the second container is

A. 5 : 6
B. 5 : 4
C. 6 : 5

D. 4 : 5

Question 7- On day one, there are 100 particles in a laboratory experiment. On day n, where $n \geq 2$, one out of every n particles produces another particle. If the total number of particles in the laboratory experiment increases to 1000 on day m, then m equals

A. 19
B. 16
C. 17
D. 18

Question 8- The average of a non-decreasing sequence of N numbers a1,a2,…,aN is 300. If a1 is replaced by 6a1, the new average becomes 400 . Then, the number of possible values of a1 is

Question 9- Let r and c be real numbers. If r and −r are roots of 5x3+cx2−10x+9=0, then c equals

A. −9/2
B. 9/2
C. −4
D. 4

Question 10- Suppose for all integers x, there are two functions f and g such that f(x)+f(x−1)−1=0 and g(x)=x2. If f(x2−x)=5, then the value of the sum f(g(5))+g(f(5)) is

Question 11- In an election, there were four candidates and 80% of the registered voters casted their votes. One of the candidates received 30% of the casted votes while the other three candidates received the remaining casted votes in the proportion 1 : 2 : 3. If the winner of the election received 2512 votes more than the candidate with the second highest votes, then the number of registered voters was

A. 40192
B. 60288
C. 50240
D. 62800

Question 12- The number of integers greater than 2000 that can be formed with the digits 0, 1, 2, 3, 4, 5, using each digit at most once, is

A. 1440
B. 1200
C. 1420
D. 1480

Question 13- For some natural number n, assume that (15,000)! is divisible by (n!)! The largest possible value of n is

A. 5
B. 7
C. 4
D. 6

Question 14- The number of distinct integer values of n satisfying $4-\log2n/3-\log4n<0$, is

Question 15- In an examination, there were 75 questions. 3 marks were awarded for each correct answer, 1 mark was deducted for each wrong answer and 1 mark was awarded for each unattempted question. Rayan scored a total of 97 marks in the examination. If the number of unattempted questions was higher than the number of attempted questions, then the maximum number of correct answers that Rayan could have given in the examination is

Question 16- Five students, including Amit, appear for an examination in which possible marks are integers between 0 and 50, both inclusive. The average marks for all the students is 38 and exactly three students got more than 32. If no two students got the same marks and Amit got the least marks among the five students, then the difference between the highest and lowest possible marks of Amit is

A. 21
B. 24
C. 20
D. 22

Question 17- The number of integer solutions of the equation $(x2-10)(x2-3x-10)=1$ is

Question 18- Mr. Pinto invests one-fifth of his capital at 6%, one-third at 10% and the remaining at 1%, each rate being simple interest per annum. Then, the minimum number of years required for the cumulative interest income from these investments to equal or exceed his initial capital is

Question 19- Consider the arithmetic progression 3,7,11,…and let An denote the sum of the first n terms of this progression. Then the value of $125\sum25n=1An$ is

A. 404
B. 442
C. 455
D. 415

Question 20- Let f(x) be a quadratic polynomial in x such that $f(x)\geq0$ for all real numbers x. If $f(2)=0$ and $f(4)=6$, then $f(-2)$ is equal to

A. 12
B. 36
C. 24

D. 6

Question 21- The length of each side of an equilateral triangle ABC is 3 cm. Let D be a point on BC such that the area of triangle ADC is half the area of triangle ABD. Then the length of AD, in cm, is

A. $\sqrt{6}$
B. $\sqrt{5}$
C. $\sqrt{8}$
D. $\sqrt{7}$

Question 22- Two ships meet mid-ocean, and then, one ship goes south and the other ship goes west, both travelling at constant speeds. Two hours later, they are 60 km apart. If the speed of one of the ships is 6 km per hour more than the other one, then the speed, in km per hour, of the slower ship is

A. 12
B. 18
C. 20
D. 24

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Question Paper Slot 3

CAT Quants (Slot 3)

Question 1- Suppose k is any integer such that the equation 2x2+kx+5=0 has no real roots and the equation x2+(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

Question 2- The minimum possible value of x2−6x+10/ 3−x, for x<3, is

A. 1/2
B. -1/2
C. 2
D. -2

Question 3- 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

Question 4- A glass contains 500 cc of milk and a cup contains 500 cc of water. From the glass, 150 cc of milk is transferred to the cup and mixed thoroughly. Next, 150 cc 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 : 10
B. 10 : 3
C. 1 : 1
D. 10 : 13

Question 5- 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

Question 6- Let r be a real number and f(x)={2x−rr if x≥r if x<r. Then, the equation f(x)=f(f(x)) holds for all real values of x where

A. x≤r
B. x≥r
C. x>r
D. x≠r

Question 7- 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

Question 8- 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

Question 9- 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 i bank C alone, then her annual interest income, in rupees, would have been

A. 900
B. 700
C. 1000
D. 800

Question 10- 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 60 km/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

Question 11- If (75−−√)3x−y=8752401 and (4ab)6x−y=(2ab)y−6x, for all non-zero real values of a and b, then the value of x+y is

Question 12- 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

Question 13- 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

Question 14- If (3+22–√) is a root of the equation ax2+bx+c=0, and (4+23–√) is a root of the equation ay2+my+n=0, where a,b,c,m and n are integers, then the value of (bm+c−2bn) is

A. 3
B. 1
C. 4
D. 0

Question 15- If c=16x/y+49y/x for some non-zero real numbers x and y, then c cannot take the value

A. -70
B. 60
C. -50
D. -60

Question 16- 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

Question 17- The average of all 3-digit terms in the arithmetic progression 38, 55, 72, ..., is

Question 18- In a triangle ABC,AB=AC=8cm. A circle drawn with BC as diameter passes through A. Another circle drawn with center at A passes through B and C. Then the area, in sq. cm, of the overlapping region between the two circles is

A. 16(π−1)
B. 32(π−1)
C. 32π
D. 16π

Question 19- A school has less than 5000 students and if the students are divided equally into teams of either 9 or 10 or 12 or 25 each, exactly 4 are always left out. However, if they are divided into teams of 11 each, no one is left out. The maximum number of teams of 12 each that can be formed out of the students in the school is

Question 20- 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

Question 21- 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. 8
B. 12
C. 6
D. 4

Question 22- The lengths of all four sides of a quadrilateral are integer valued. If three of its sides are of length 1 cm, 2 cm and 4 cm, then the total number of possible lengths of the fourth side is

A. 6
B. 4
C. 5
D. 3