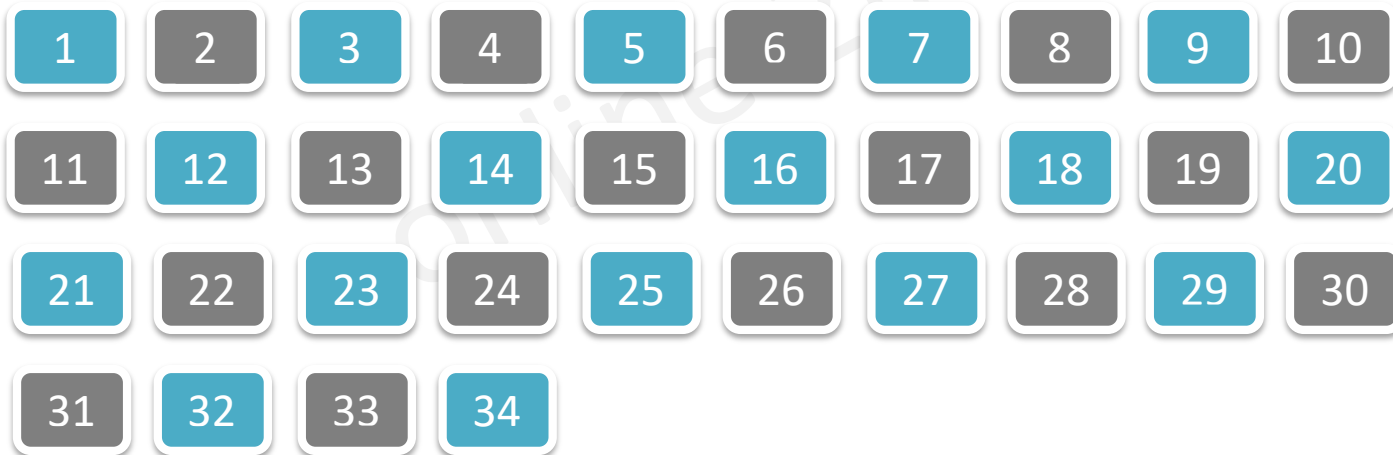# CAT 2019 Slot 2 – Quantitative Ability

Number of Questions: 34

Duration: 1 hour

Marking scheme: +3(for correct answer) & -1(for wrong answer)

How to take value from this PDF?

- You can take this is as a sectional test. Or you can just solve these questions one-at-a-time regardless of any time limit. Either way, we want you to attempt the question first, before looking at the solution.

- A detailed video-solution has been provided for each question.

- For advice on CAT preparation, various test-taking strategies and MBA in general, click me.

How to use this PDF?

- Click on the blue colored "Answers" tab to see the correct answer to the question.

- The grey colored "Video solutions" tab will re-direct you to a YouTube page where the solution is elaborately discussed.

- Similarly, you can navigate back to the question from the solutions by clicking on the "Back to the Question" tab.

- You can find many CAT level questions from 2IIM's Question Bank, that too free of cost. Click on questions.2iim.com (present at the bottom of each slide) to know more.

Question 1

The real root of the equation $2^{6x} + 2^{3x+2} - 21 = 0$ is

A) $\dfrac{log_2 3}{3}$

B) $log_2 9$

C) $\dfrac{log_2 7}{3}$

D) $log_2 27$

Question 2

The average of 30 integers is 5. Among these 30 integers, there are exactly 20 which do not exceed 5. What is the highest possible value of the average of these 20 integers?

A) 4

B) 5

C) 4.5

D) 3.5

Answer

Question 3

Let a, b, x, y be real numbers such that $a^2+b^2 = 25$, $x^2+y^2 = 169$ and ax + by = 65. If k = ay - bx, then

A) k = 0

B) $k > \dfrac{5}{13}$

C) $k = \dfrac{5}{13}$

D) $0 < k \leq \dfrac{5}{13}$

Question 4

In a triangle ABC, medians AD and BE are perpendicular to each other, and have lengths 12 cm and 9 cm, respectively. Then, the area of triangle ABC, in sq cm, is

A) 80

B) 68

C) 72

D) 78

Answer

Question 5

Let a_1, a_2,…be integers such that

$a_1 - a_2 + a_3 - a_4 + \ldots (-1)^{n-1} a_n = n$, for $n \geq 1$.

Then $a_{51} + a_{52} + \ldots + a_{1023}$ equals

A) -1

B) 1

C) 0

D) 10

Answer

Question 6

How many factors of 2^4 x 3^5 x 10^4 are perfect squares which are greater than 1?

[TITA]

Answer

Question 7

Two circles, each of radius 4 cm, touch externally. Each of these two circles is touched externally by a third circle. If these three circles have a common tangent, then the radius of the third circle, in cm, is

A) $\pi/3$

B) 1

C) $1/\sqrt{2}$

D) $\sqrt{2}$

Answer

2IIM

Question 8

What is the largest positive integer such that $\frac{n^2+7n+12}{n^2-n-12}$ is also positive integer ?

A) 6

B) 8

C) 16

D) 12

Answer

Question 9

In 2010, a library contained a total of 11500 books in two categories - fiction and non-fiction. In 2015, the library contained a total of 12760 books in these two categories. During this period, there was 10% increase in the fiction category while there was 12% increase in the non-fiction category. How many fiction books were in the library in 2015?

A) 6600

B) 6160

C) 6000

D) 5500

Answer

Question 10

Let f be a function such that f (mn) = f (m) f (n) for every positive integers m and n. If f (1), f (2) and f (3) are positive integers,

f (1) < f (2), and f (24) = 54, then f (18) equals

[TITA]

Question 11

Let A and B be two regular polygons having a and b sides, respectively. If b = 2a and each interior angle of B is 3/2 times each interior angle of A, then each interior angle, in degrees, of a regular polygon with a + b sides is

[TITA]

Answer

Question 12

A cyclist leaves A at 10 am and reaches B at 11 am. Starting from 10:01 am, every minute a motorcycle leaves A and moves towards B. Forty-five such motorcycles reach B by 11 am. All motorcycles have the same speed. If the cyclist had doubled his speed, how many motorcycles would have reached B by the time the cyclist reached B?

A) 22

B) 20

B) 15

D) 23

Answer

Question 13

Let A be a real number. Then the roots of the equation

$x^2 - 4x - \log_2 A = 0$ are real and distinct if and only if

A) A < 1/16

B) A > 1/8

C) A > 1/16

D) A < 1/8

Answer

Question 14

John jogs on track A at 6 kmph and Mary jogs on track B at 7.5 kmph. The total length of tracks A and B is 325 metres. While John makes 9 rounds of track A, Mary makes 5 rounds of track B. In how many seconds will Mary make one round of track A?

[TITA]

Answer

Question 15

Anil alone can do a job in 20 days while Sunil alone can do it in 40 days. Anil starts the job, and after 3 days, Sunil joins him. Again, after a few more days, Bimal joins them and they together finish the job. If Bimal has done 10% of the job, then in how many days was the job done?

A) 13

B) 12

C) 15

D) 14

Answer

Question 16

In an examination, Rama's score was one-twelfth of the sum of the scores of Mohan and Anjali. After a review, the score of each of them increased by 6. The revised scores of Anjali, Mohan, and Rama were in the ratio 11:10:3. Then Anjali's score exceeded Rama's score by

A) 26

B) 32

C) 24

D) 35

Answer

Question 17

In an examination, the score of A was 10% less than that of B, the score of B was 25% more than that of C, and the score of C was 20% less than that of D. If A scored 72, then the score of D was

[TITA]

Answer

Question 18

The base of a regular pyramid is a square and each of the other four sides is an equilateral triangle, length of each side being 20 cm. The vertical height of the pyramid, in cm, is

A) $10\sqrt{2}$

B) $8\sqrt{3}$

C) 12

D) $5\sqrt{5}$

Answer

If x is a real number, then $\sqrt{log_e \frac{4x - x^2}{3}}$ is a real number number if and only if

A) $-3 \leq x \leq 3$

B) $1 \leq x \leq 2$

C) $1 \leq x \leq 3$

D) $-1 \leq x \leq 3$

Answer

Question 20

Let ABC be a right-angled triangle with hypotenuse BC of length 20 cm. If AP is perpendicular on BC, then the maximum possible length of AP, in cm, is

A) 10

B) 8√2

C) 6√2

D) 5

Answer

Question 21

Two ants A and B start from a point P on a circle at the same time, with A moving clock-wise and B moving anti-clockwise. They meet for the first time at 10:00 am when A has covered 60% of the track. If A returns to P at 10:12 am, then B returns to P at

A) 10:27 am

B) 10:25 am

C) 10:45 am

D) 10:18 am

Answer

Question 22

How many pairs of (m,n) satisfy the equation $m^2 + 105 = n^2$?

[TITA]

Answer

Question 23

The salaries of Ramesh, Ganesh and Rajesh were in the ratio 6:5:7 in 2010, and in the ratio 3:4:3 in 2015. If Ramesh's salary increased by 25% during 2010-2015, then the percentage increase in Rajesh's salary during this period is closest to

A) 7

B) 9

C) 8

D) 10

Answer

Question 24

A man makes complete use of 405 cc of iron, 783 cc of aluminum, and 351 cc of copper to make a number of solid right circular cylinders of each type of metal. These cylinders have the same volume and each of these has radius 3 cm. If the total number of cylinders is to be kept at a minimum, then the total surface area of all these cylinders, in sq cm, is

A) 1044(4 + π)

B) 8464π

C) 928π

D) 1026(1 + π)

Answer

Question 25

The quadratic equation $x^2 + bx + c = 0$ has two roots 4a and 3a, where a is an integer. Which of the following is a possible value of $b^2 + c$?

A) 3721

B) 549

C) 361

D) 427

Answer

Question 26

In a six-digit number, the sixth, that is, the rightmost, digit is the sum of the first three digits, the fifth digit is the sum of first two digits, the third digit is equal to the first digit, the second digit is twice the first digit and the fourth digit is the sum of fifth and sixth digits. Then, the largest possible value of the fourth digit is

[TITA]

Answer

Question 27

Mukesh purchased 10 bicycles in 2017, all at the same price. He sold six of these at a profit of 25% and the remaining four at a loss of 25%. If he made a total profit of Rs. 2000, then his purchase price of a bicycle, in Rupees, was

A) 2000

B) 6000

C) 8000

D) 4000

Answer

The number of common terms in the two sequences:

15, 19, 23, 27, ... , 415 and 14, 19, 24, 29, . . . , 464 is

A) 20

B) 18

C) 21

D) 19

Answer

If (2n+1) + (2n+3) + (2n+5) + … + (2n+47) = 5280, then what is the value of 1+2+3+...+n ?

[TITA]

Question 30

The strength of a salt solution is p% if 100 ml of the solution contains p grams of salt. Each of three vessels A, B, C contains 500 ml of salt solution of strengths 10%, 22%, and 32%, respectively. Now, 100 ml of the solution in vessel A is transferred to vessel B. Then, 100 ml of the solution in vessel B is transferred to vessel C. Finally, 100 ml of the solution in vessel C is transferred to vessel A. The strength, in percentage, of the resulting solution in vessel A is

A) 15

B) 12

C) 13

D) 14

Answer

Question 31

If $5^x - 3^y = 13438$ and $5^{x-1}+3^{y+1} = 9686$, then x+y equals

[TITA]

Answer

Amal invests Rs 12000 at 8% interest, compounded annually, and

Rs10000 at 6% interest, compounded semi-annually, both investments being for one year. Bimal invests his money at 7.5% simple interest for one year. If Amal and Bimal get the same amount of interest, then the amount, in Rupees, invested by Bimal is

[TITA]

Answer

Question 33

A shopkeeper sells two tables, each procured at cost price p, to Amal and Asim at a profit of 20% and at a loss of 20%, respectively. Amal sells his table to Bimal at a profit of 30%, while Asim sells his table to Barun at a loss of 30%. If the amounts paid by Bimal and Barun are x and y, respectively, then (x −y) / p equals

A) 1

B) 1.2

C) 0.7

D) 0.50

Answer

John gets Rs 57 per hour of regular work and Rs 114 per hour of overtime work. He works altogether 172 hours and his income from overtime hours is 15% of his income from regular hours. Then, for how many hours did he work overtime?

[TITA]

Done with the Questions! Take a break☺

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Solutions

1) Option A
2) Option C
3) Option A
4) Option C
5) Option B
6) 44
7) Option B
8) Option D
9) Option A
10) 12

11) 150
12) Option C
13) Option C
14) 48
15) Option A
16) Option B
17) 80
18) Option A
19) Option C
20) Option A

21) Option A
22) 4
23) Option A
24) Option D
25) Option B
26) 7
27) Option D
28) Option A
29) 4851
30) Option D

31) 13
32) 20920
33) Option A
34) 12

Sol 1

The real root of the equation $2^{6x} + 2^{3x+2} - 21 = 0$ is

A) $\dfrac{log_2 3}{3}$

B) $log_2 9$

C) $\dfrac{log_2 7}{3}$

D) $log_2 27$

Back to Question

Difficulty Level – Medium

Topic – Logarithms

Sol 2

The average of 30 integers is 5. Among these 30 integers, there are exactly 20 which do not exceed 5. What is the highest possible value of the average of these 20 integers?

A) 4

B) 5

C) **4.5**

D) 3.5

Difficulty Level – Medium

Topic – Averages

Actual CAT 2019 Question Paper

Sol 3

Let a, b, x, y be real numbers such that $a^2 + b^2 = 25$, $x^2 + y^2 = 169$ and $ax + by = 65$. If

k = ay - bx, then

A) **k=0**

B) $k > \frac{5}{13}$

C) $k = \frac{5}{13}$

D) $0 < k \leq \frac{5}{13}$

Difficulty Level – Hard

Topic – Number theory

Sol 4

In a triangle ABC, medians AD and BE are perpendicular to each other, and have lengths 12 cm and 9 cm, respectively. Then, the area of triangle ABC, in sq cm, is

A) 80

B) 68

C) **72**

D) 78

Difficulty Level – Medium

Topic – Geometry

Sol 5

Let a_1, a_2 be integers such that

$a_1 - a_2 + a_3 - a_4 + \ldots \ldots (-1)^{n-1} a_n = n$, for $n \geq 1$. Then $a_{51} + a_{52} + \ldots + a_{1023}$ equals

A) -1

B) **1**

C) 0

D) 10

Difficulty Level – Hard

Topic – Sequence & series

Sol 6

How many factors of 2^4 x 3^5 x 10^4 are perfect squares which are greater than 1?

[TITA]

Answer: **44**

Difficulty Level – Medium

Topic – Number theory

Sol 7

Two circles, each of radius 4 cm, touch externally. Each of these two circles is touched externally by a third circle. If these three circles have a common tangent, then the radius of the third circle, in cm, is

A) π/3

B) **1**

C) 1/√2

D) √2

Difficulty Level – Hard

Topic – Geometry

Actual CAT 2019 Question Paper

Sol 8

What is the largest positive integer such that $\frac{n^2+7n+12}{n^2-n-12}$ is also positive integer ?

A) 6

B) 8

C) 16

D) **12**

Difficulty Level – Medium

Topic – Linear & quadratic equations

Sol 9

In 2010, a library contained a total of 11500 books in two categories - fiction and non-fiction. In 2015, the library contained a total of 12760 books in these two categories. During this period, there was 10% increase in the fiction category while there was 12% increase in the non-fiction category. How many fiction books were in the library in 2015?

A) **6600**

B) 6160

C) 6000

D) 5500

Difficulty Level – Medium

Topic – Percentages

Sol 10

Let f be a function such that f (mn) = f (m) f (n) for every positive integers m and n. If f (1), f (2) and f (3) are positive integers, f (1) < f (2), and f (24) = 54, then f (18) equals

[TITA]

Answer: **12**

Difficulty Level – Medium

Topic – Functions

Sol 11

Let A and B be two regular polygons having a and b sides, respectively. If b = 2a and each interior angle of B is 3/2 times each interior angle of A, then each interior angle, in degrees, of a regular polygon with a + b sides is

[TITA]

Answer: **150**

Difficulty Level – Medium

Topic – Geometry

Sol 12

A cyclist leaves A at 10 am and reaches B at 11 am. Starting from 10:01 am, every minute a motorcycle leaves A and moves towards B. Forty-five such motorcycles reach B by 11 am. All motorcycles have the same speed. If the cyclist had doubled his speed, how many motorcycles would have reached B by the time the cyclist reached B?

A) 22

B) 20

B) **15**

D) 23

Difficulty Level – Medium

Topic – Speed, Time & distance

Sol 13

Let A be a real number. Then the roots of the equation

$x^2 - 4x - \log_2 A = 0$ are real and distinct if and only if

A) A < 1/16

B) A > 1/8

C) **A > 1/16**

D) A < 1/8

Back to Question

Difficulty Level – Medium

Topic – Linear & Quadratic equations

Sol 14

John jogs on track A at 6 kmph and Mary jogs on track B at 7.5 kmph. The total length of tracks A and B is 325 metres. While John makes 9 rounds of track A, Mary makes 5 rounds of track B. In how many seconds will Mary make one round of track A?

[TITA]

Answer: **48**

Difficulty Level – Medium

Topic – Races

Sol 15

Anil alone can do a job in 20 days while Sunil alone can do it in 40 days. Anil starts the job, and after 3 days, Sunil joins him. Again, after a few more days, Bimal joins them and they together finish the job. If Bimal has done 10% of the job, then in how many days was the job done?

A) **13**

B) 12

C) 15

D) 14

Difficulty Level – Medium

Topic – Work & time

Back to Question

Sol 16

In an examination, Rama's score was one-twelfth of the sum of the scores of Mohan and Anjali. After a review, the score of each of them increased by 6. The revised scores of Anjali, Mohan, and Rama were in the ratio 11:10:3. Then Anjali's score exceeded Rama's score by

A) 26

B) **32**

C) 24

D) 35

Difficulty Level – Medium

Topic – Ratio & proportion

Sol 17

In an examination, the score of A was 10% less than that of B, the score of B was 25% more than that of C, and the score of C was 20% less than that of D. If A scored 72, then the score of D was

[TITA]

Answer : **80**

Difficulty Level – Medium

Topic – Percentages

Sol 18

The base of a regular pyramid is a square and each of the other four sides is an equilateral triangle, length of each side being 20 cm. The vertical height of the pyramid, in cm, is

A) **10√2**

B) 8√3

C) 12

D) 5√5

Difficulty Level – Medium

Topic – Mensuration

Actual CAT 2019 Question Paper

Sol 19

If x is a real number ,then $\sqrt{log_e \frac{4x-x^2}{3}}$ is a real number if and only if

A) $-3 \leq x \leq 3$

B) $1 \leq x \leq 2$

C) **$1 \leq x \leq 3$**

D) $-1 \leq x \leq 3$

Difficulty Level – Hard

Topic – Logarithms

Sol 20

Let ABC be a right-angled triangle with hypotenuse BC of length 20 cm. If AP is perpendicular on BC, then the maximum possible length of AP, in cm, is

A) **10**

B) 8√2

C) 6√2

D) 5

Difficulty Level – Medium

Topic – Geometry

Sol 21

Two ants A and B start from a point P on a circle at the same time, with A moving clock-wise and B moving anti-clockwise. They meet for the first time at 10:00 am when A has covered 60% of the track. If A returns to P at 10:12 am, then B returns to P at

A) **10:27 am**

B) 10:25 am

C) 10:45 am

D) 10:18 am

Back to Question

Difficulty Level – Medium

Topic – Speed, time & distance

Sol 22

How many pairs of (m,n) satisfy the equation $m^2 + 105 = n^2$?

[TITA]

Answer : **4**

Difficulty Level – Medium

Topic – Number theory

Sol 23

The salaries of Ramesh, Ganesh and Rajesh were in the ratio 6:5:7 in 2010, and in the ratio 3:4:3 in 2015. If Ramesh's salary increased by 25% during 2010-2015, then the percentage increase in Rajesh's salary during this period is closest to

A) **7**

B) 9

C) 8

D) 10

Difficulty Level – Medium

Topic – Ratio & proportion

Sol 24

A man makes complete use of 405 cc of iron, 783 cc of aluminium, and 351 cc of copper to make a number of solid right circular cylinders of each type of metal. These cylinders have the same volume and each of these has radius 3 cm. If the total number of cylinders is to be kept at a minimum, then the total surface area of all these cylinders, in sq cm, is

A) 1044(4 + π)

B) 8464π

C) 928π

D) **1026(1 + π)**

Difficulty Level – Hard

Topic – Mensuration

Sol 25

The quadratic equation $x^2 + bx + c = 0$ has two roots 4a and 3a, where a is an integer. Which of the following is a possible value of $b^2 + c$?

A) 3721

B) **549**

C) 361

D) 427

Difficulty Level – Hard

Topic – Linear & quadratic equations

Sol 26

In a six-digit number, the sixth, that is, the rightmost, digit is the sum of the first three digits, the fifth digit is the sum of first two digits, the third digit is equal to the first digit, the second digit is twice the first digit and the fourth digit is the sum of fifth and sixth digits. Then, the largest possible value of the fourth digit is

[TITA]

Answer : 7

Difficulty Level – Medium

Topic – Number theory

Sol 27

Mukesh purchased 10 bicycles in 2017, all at the same price. He sold six of these at a profit of 25% and the remaining four at a loss of 25%. If he made a total profit of Rs. 2000, then his purchase price of a bicycle, in Rupees, was

A) 2000

B) 6000

C) 8000

D) **4000**

Difficulty Level – Medium

Topic – Profit & loss

Actual CAT 2019 Question Paper

Sol 28

The number of common terms in the two sequences:

15, 19, 23, 27, ... , 415 and 14, 19, 24, 29, . . . , 464 is

A) **20**

B) 18

C) 21

D) 19

Difficulty Level – Medium

Topic – Sequence & series

Sol 29

If $(2n+1) + (2n+3) + (2n+5) + \ldots + (2n+47) = 5280$, then what is the value of $1+2+3+...+n$?

[TITA]

Answer: **4851**

Difficulty Level – Medium

Topic – Sequence & series

Sol 30

The strength of a salt solution is p% if 100 ml of the solution contains p grams of salt. Each of three vessels A, B, C contains 500 ml of salt solution of strengths 10%, 22%, and 32%, respectively. Now, 100 ml of the solution in vessel A is transferred to vessel B. Then, 100 ml of the solution in vessel B is transferred to vessel C. Finally, 100 ml of the solution in vessel C is transferred to vessel A. The strength, in percentage, of the resulting solution in vessel A is

A) 15

B) 12

C) 13

D) **14**

Difficulty Level – Hard

Topic – Mixtures

Sol 31

If $5^x - 3^y = 13438$ and $5^{x-1} + 3^{y+1} = 9686$, then x+y equals

[TITA]

Answer: **13**

Difficulty Level – Medium

Topic – Exponents & Powers

Sol 32

Amal invests Rs 12000 at 8% interest, compounded annually, and Rs.10000 at 6% interest, compounded semi-annually, both investments being for one year. Bimal invests his money at 7.5% simple interest for one year. If Amal and Bimal get the same amount of interest, then the amount, in Rupees, invested by Bimal is

[TITA]

Answer: **20920**

Difficulty Level – Medium

Topic – Simple interest & Compound interest

Sol 33

A shopkeeper sells two tables, each procured at cost price p, to Amal and Asim at a profit of 20% and at a loss of 20%, respectively. Amal sells his table to Bimal at a profit of 30%, while Asim sells his table to Barun at a loss of 30%. If the amounts paid by Bimal and Barun are x and y, respectively, then (x −y) / p equals

A) **1**

B) 1.2

C) 0.7

D) 0.50

Difficulty Level – Medium

Topic – Profit & loss

Sol 34

John gets Rs 57 per hour of regular work and Rs 114 per hour of overtime work. He works altogether 172 hours and his income from overtime hours is 15% of his income from regular hours. Then, for how many hours did he work overtime?

[TITA]

Answer: **12**

Difficulty Level – Medium

Topic – Work & time

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