



CAT Full Length Quant Assignment 1

Allotted time = 1 hour

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This Assignment is created to help students to prepare for Quant section of CAT. It contains 30 questions.

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1. A plant for production of Silica (SiO_2) Powder has 4 infinite capacity tanks P, Q, R and S. P contains 3000 litres of the chemical, Q contains 2000 litres of the chemical and R contains 1000 and S contains 4000 litres of the chemical.

P Pumps 40 litres/minute into Q

Q Pumps 20 litres/minute into R

R Pumps 10 litres/minute into P

S pumps 30 litres/minute into P

Q pumps 10 litres/minute into S

Which tank would get empty first. And what is the duration that it will take to get empty.

- i. S and 60 minutes
- ii. P and 60 minutes
- iii. S and 50 minutes
- iv. S and 40 minutes

2. Find the remainder when $49^3 + 50^3 + 51^3 + 52^3$ is divided by 202.

- i. 8
- ii. 201
- iii. 0
- iv. 100

3. Two circles of radius 1 unit intersect orthogonally. Find the area common to both the circles.

- i. $\frac{1}{2} \pi - 1$
- ii. $\pi - 1$
- iii. $\frac{1}{2} \pi - 2$
- iv. $\pi - 2$

4. Two identical circles touch (externally) at a point. They are enclosed by a rectangle that touches both the circles. Find the ratio of perimeter of the rectangle to the perimeter of both the circles combined.

- i. $3/\pi$
- ii. $3/2\pi$
- iii. $1/\pi$
- iv. $4/\pi$

5. At a casino in Goa, heads-up (one on one) poker tournament was played. 105 matches were played between two foreigners while 190 matches were played between two Indians. How many games were played between an Indian and a foreigner.
- 100
 - 200
 - 300
 - 400

Solve questions 6 and 7 from the instructions below.

Distance between Delhi and Lucknow is 600 km. Rajdhani express starts from Delhi at midnight with a constant speed of 60 km/hr and keeps on moving between Delhi and Lucknow non-stop. Shatabdi Express starts from Delhi at 8 a.m. with a constant speed of 100 km/hr and keeps moving between Delhi and Lucknow non-stop. Answer the following:

6. At what time do the two trains meet for the first time.
- 12:00 noon
 - 12:30 p.m.
 - 11:00 a.m.
 - 1:00 p.m.
7. At what time will Shatabdi overtake Rajdhani?
- 6 p.m.
 - 8 p.m.
 - 10 p.m.
 - 11 p.m.

8. For a, b and n greater than 1 and $a - b > 1$, the expression:

$$\frac{a^n - b^n}{a^{n-1} + b^{n-1}} \text{ is}$$

- Greater than 1
- Between 1 and 0
- Between 0.1 and 0
- Between 0.1 and 1

9. Two parallel chords A and B of a circle are of lengths 16 cm and 30 cm respectively, are inside a circle of diameter 34cm. Find the distance between the chords if they are at the opposite sides of the centre.

- i. 21
- ii. 20
- iii. 22
- iv. 23

10. For what value of k does the equations

$$x^2 - y^2 = 0$$

and $(ax + k)^2 + y^2 = 1$ yield unique solutions

- i. $\pm a$
- ii. $\pm\sqrt{a^2 - 1}$
- iii. $\pm\sqrt{2a^2 - 1}$
- iv. $\pm\sqrt{a^2 - 2}$

11. What is the remainder when $12 + [(3 * 3!) + (4 * 4!) + (5 * 5!) + \dots + (16 * 16!)]$ is divided by 17

- i. 3
- ii. 5
- iii. 6
- iv. 8

12. Find the number of points with integral coordinates enclosed within the figure made by the lines $x = 0$, $y = 0$ and $x + y = 12$.

(exclude the points on the boundaries)

- i. 32
- ii. 64
- iii. 66
- iv. 128

13. Find the coordinate of a point equidistant from (1, -6), (5, -6) and (6, -1).

- i. (0, 3)
- ii. (3, 0)
- iii. (3, 3)
- iv. (3, -3)

14. If $P_{k+1} = P_k + n^2 + 3n + 2$

If $P_1 = 2$

Find the value of P_{100}

- i. 34340
- ii. 343400
- iii. 340000
- iv. 343450

15. Sum of 4 natural numbers (p, q, r, s) is 20. How many such sets (p, q, r, s) of 4 numbers exist?

- i. ${}^{19}C_2$
- ii. ${}^{19}C_3$
- iii. ${}^{20}C_2$
- iv. ${}^{20}C_3$

16. What is the rightmost non-zero digit of 70^{2016} ?

- i. 3
- ii. 2
- iii. 7
- iv. 1

17. In a game of counter-strike, there are 4 points in a straight line A, B, C, D in the same order. All the points are equidistant from each other with a distance of 1 unit. Grenades are planted between B and C. A player wants to go from A to D but would not go within 1-unit distance of the line segment BC. Find the minimum distance he has to transverse.

- i. π
- ii. $\pi + 1$
- iii. $\pi/2 + 1$
- iv. $\pi + 2$

18. If $\log_{0.5}(x + 12) > -2$ then which of the following is a valid x ?

- i. -12
- ii. 12
- iii. 16
- iv. 20

19. If 7^3 and 19^2 are factors of a number $x * 21 * 35 * 95$ what is the smallest possible value of x ?

- i. 135
- ii. 133
- iii. 134
- iv. 132

20. If 5, 8 and ' x ' are sides of an acute angled triangle, how many integer values of ' x ' are possible?

- i. 3
- ii. 4
- iii. 5
- iv. 6

21. Product of 15 consecutive terms of a Geometric series is 2^{30} . Find the 8th term of the progression.

- i. 2^2
- ii. 2^6
- iii. 2^{10}
- v. Insufficient Data

22. In a QS World MBA Tour Event held in Mumbai, 15 different universities were invited. 6 universities are from Americas, 6 are from Europe and 3 are from Asia. 10 universities were given an opportunity to organize a seminar. If at least two universities from each of the 3 continents must give a seminar, in how many ways seminars can be conducted?

- i. 850850
- ii. 850000
- iii. 850900
- iv. 850950

23. How many 4 digit positive integers divisible by 5 can be formed using the digits 0, 1, 3, 5, 7, 9 such that the digits are not repeated?

- i. 106
- ii. 107
- iii. 108
- iv. 109

24. An isosceles trapezium with parallel sides measuring 12cm and 10cm is rotated about its axis of symmetry (within its plane). Find the volume of solid created if the height of the trapezium is 5cm.

- i. $1820\pi/3$
- ii. $182\pi/3$
- iii. $1000\pi/3$
- iv. $2000\pi/3$

25. Find the value of $\sqrt{3 + \sqrt{3 - \sqrt{3 + \sqrt{3 - \sqrt{3 \dots}}}}}$

- i. 3
- ii. 4
- iii. 2
- iv. 1

26. For a function f , if $f(k) = f^{-1}(k)$, Which of the following always holds true?

- i. $f(k) = 1/k$
- ii. $f(k) = 1$
- iii. $f^{-1}(k) = k$
- iv. $f^{-1}(k) = 1$

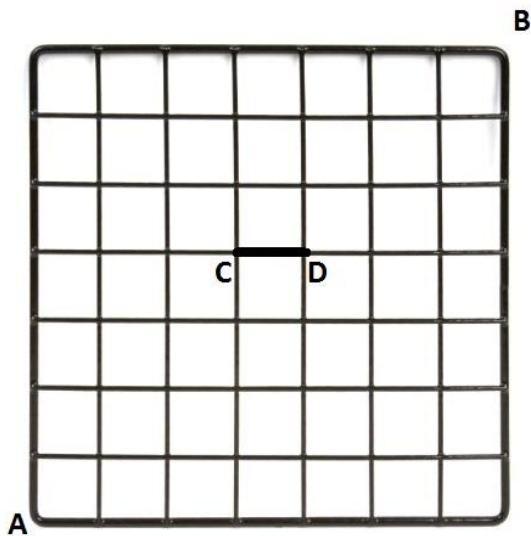
27. If $f(x) = \max(2-x, x^2 + x - 6)$, find the minimum value of $f(x)$.

- i. -1
- ii. 0
- iii. 1
- iv. 2

28. In a combined project of QS-LEAP and QS-TopMBA employees, they have to speak to 1000 students per day to get their reviews. QS-TopMBA employee can handle 40 calls/day while a QS-LEAP employee can handle 50 calls/day. QS-TopMBA employees get fixed amount Rs. 250/day, while QS-LEAP employees get fixed amount Rs. 300/day. In addition, QS-TopMBA employees get Rs. 15/call they complete and QS-LEAP employee get Rs. 10/call they complete. How many employees from QS-TopMBA should be taken in on the project if more than 7 out of 12 QS-LEAP employees have to be involved in the project and QS has to minimize the cost?

- i. 9
- ii. 10
- iii. 11
- iv. 12

29. Ref. to figure. How many ways are there to go from A to B without going through the path CD. Considering you can only follow the guidelines and no returning back.



- i. $13! / 6! * 7! - ((7! / 3! * 4!) * (6! / 3! * 3!))$

- ii. $14! / 7! * 7! - ((7! / 3! * 4!) * (7! / 4! * 3!))$
- iii. $13! / 6! * 7! - ((7! / 3! * 4!) * (7! / 4! * 3!))$
- iv. $14! / 7! * 7! - ((7! / 3! * 4!) * (6! / 3! * 3!))$

30. If $\log_2 x + 35 \log_x 2 = 12$,

Which of the following is a valid x:?

- i. 2^4
- ii. 2^6
- iii. 2^7
- iv. 2^8