CAT Mock Paper 4

By www.collegedunia.com

Quantitative Ability

Directions for questions 1 to 6: Answer the question independently of the other questions.

1. What is the minimum value of the sum of the squares of the roots of the equation $x^2 - (\alpha - 2)x + (\alpha - 5) = 0$, where α is a positive number?

(1) 0

(2) 2

(3) 5

(4) Cannot be determined

2. Let S be a set of positive integers such that every element n of S satisfies the conditions
(a) 1000 b) every digit in n is odd. Then how many elements of S are divisible by 3?
1) 9
(2) 10
(3) 11
(4) 12

3. When 952 is divided by a number, the remainder left is 124. Find the remainder left if 68 divides the same number.

(1) 14

(2) 26

(3) 40

(4) 56

4. If $x = 2 + 2^{2/3} + 2^{1/3}$, then which of the following is true?

(1) $2x^3 + 6x - 2x^2 + 3 = 0$
(2) $6x^3 + x^2 - 12 + 6 = 0$
(3) $x^3 - 6x^2 + 6x - 2 = 0$
(4) $x^3 - 12x^2 + x - 4 = 0$

5. The function f(x) = | x - 1 | + | 2.8 - x | + | x - 3 |, where x is a real number, can attain a minimum value of

(1) 1

(2) 2

(3) 3

(4) 2.8

6. If f(x) = x^3 – 4x + p, and f (0) and f(1) are of opposite signs, then which of the following is necessarily true?
(1)–1 < p < 2
(2)0 < p < 3
(3)–2 < p < 1
(4)–2 < p < 1

7. A tank can be filled by two taps - Tap I and Tap II. The volume of the tank is 5000 litres. Tap I fills the tank at a rate of 1 litre/second. Tap II fills the tank at a rate of 3 litres in 2 seconds. On a particular day, Tap II is opened $33\frac{1}{3}$ minutes after the time at which Tap I is opened. If after 45 minutes from the time when Tap I was opened, the tank develops a hole which empties the tank at the rate of 2.5 litres/second, how full is the tank in 2 hours from the time when Tap I opened?

(1) $\frac{1}{10}$

(2) full

(3) $\frac{3}{4}$

(4) $\frac{4218}{5000}$

8. The name of 'Modern Food Stores' is displayed on a board at a junction using neon lights. When the board is switched on, the lights in each word follow a cyclic pattern of turning on and off. The first word remains lighted for $1\frac{3}{4}$ seconds and then remains switched off for 2 seconds. The second word remains switched on for $3\frac{2}{3}$ seconds and then remains switched off for 2 seconds. The third word remains switched on for $7\frac{1}{2}$ seconds and then remains switched off for 2 seconds. If the board is switched on, what is the smallest interval, after which the entire display will again turn on simultaneously?

(1) 61.5 seconds

(2) 97.5 seconds

(3) 807.5 seconds

(4) 4845 seconds

Directions for questions 9 and 10: Answer the question on the basis of the information given below.

Triplets consisting of three different numbers are formed from numbers 1 to 10.

9. How many of these triplets are such that the sum of the numbers is divisible by 3?

(1) 37

(2) 42

(3) 36

(4) 48

10. How many of the triplets formed are such that the sum of the numbers is divisible by 9 and they do not have a 9 in them?
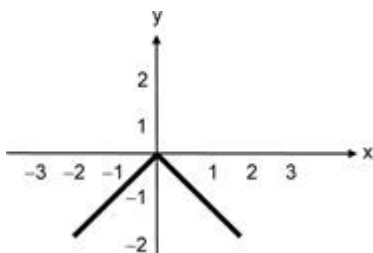
(1) 7

(2) 6

(3) 9

(4) 10

11. What is the value of the expression given below?

$$\cfrac{1}{1^2 - \cfrac{1}{2^2 - \cfrac{1}{3^2 - \cfrac{1}{4^2 - \frac{1}{5^2}}}}} + \cfrac{1}{-3 + \cfrac{1}{3^2 - \cfrac{1}{4^2 - \frac{1}{5^2}}}}$$

(1) 1.33

(2) 1.25

(3) 1

(4) None of these

12. The graph below gives a function f(x), represented by thickened line segments. From among the choices given, choose the function that best describes f(x).

(1) $f(x) = -f(-x)$

(2) $f(x) = f(-x)$

(3) $f(x) = f(-x) + 2$

(4) $f(x) = 1 - f(-x)$

13. A square PQRS is constructed in an equilateral triangle ABC, such that P and S lie on the sides AB and AC respectively, while Q and R lie on side BC. If ∠ BPC = θ, then

(1) $\theta > 105°$

(2) $90° < \theta < 105°$

(3) $\theta = 90°$

(4) $75° < \theta < 90°$

14. Twenty persons went on a picnic. Three out of every five in the group do not like pulav but two out of every four carried pulav with them. Then, we can conclude that

(1) at least two persons who do not like pulav carried pulav with them.

(2) at least eight persons who do not like pulav carried pulav with them.

(3) at the most eight persons who do not like pulav carried pulav with them.

(4) at the most two persons who do not like pulav carried pulav with them.

Directions for questions 15 and 16: Answer the question on the basis of the information given below.

Let $E_n = 2 - 4 + 6 - 8 + 10$ ------- $(-1)^{n+1} . (2n)$ and $F_n = 4 + 1 - 2 + 12 + 3$

- 6 + 36 + 9 - 18 ------ n terms.

15. What is the value of E_{110}?

(1) -220

(2) -202

(3) 440

(4) None of these

16. If $2F_n + 3 = 81^6$ then what is the value of n?

(1) 17

(2) 23

(3) 69

(4) 42

Directions for questions 17 to 26: Answer the question independently of the other questions.

17. There are two concentric circles. The radius of the outer circle is 8.5 cm and the length of the longest chord of the outer circle that doesn't cut through the inner circle is 8 cm. What fraction of the bigger circle is not covered by the smaller circle?

(1) $\dfrac{64}{289}$

(2) $\dfrac{8}{17}$

(3) $\dfrac{225}{289}$

(4) $\dfrac{89}{289}$

18. Three numbers in geometric progression are such that if 64 is decreased from the largest, then the three numbers thus obtained would be in arithmetic progression. Further if the middle number of the new set of numbers is reduced by 8, the numbers thus obtained would be in geometric progression. Find the middle term of the original sequence.

(1) 5

(2) 20

(3) $\dfrac{52}{9}$

(4) Cannot be determined

19. Find prt : qsu, given that p : r = 2 : 3, q : s = 4 : 3, r : t = 8 : 9, s : u = 3 : 2 and t : q = 3 : 4

(1) $\dfrac{4}{27}$

(2) $\dfrac{8}{27}$

(3) $\dfrac{16}{27}$

(4) $\dfrac{16}{27}$

20. Find the number of five-digit multiples of 4, which can be formed using the digits from 1 to 7, using each digit at most once.

(1) 720
(2) 84
(3) 840
(4) 600

21. In a company, the number of married employees is a prime number. Which of the following cannot be the ratio of the total number of employees and the number of unmarried employees?

(1) 173 : 90
(2) 193 : 80
(3) 181 : 32
(4) 201 : 32

22. The speeds of Aniket, Brihat and Chatur are in the ratio of 4 : 3 : 2. If Chatur takes half an hour more than Brihat to travel from P to Q, what is the total time taken by Aniket to travel from P to Q and then back from Q to P?

(1) 120 minutes
(2) 90 minutes
(3) 60 minutes
(4) 45 minutes

 23. Let f(x) = max(2x + 1; 3 – 4x), where x is any real number. Then the minimum possible value of f(x) is:
(1)1/3
(2)1/2
(3)2/3
(4)5/3

24. In the adjoining figure, chord ED is parallel to diameter AC of the circle. If CBE=65 Then what is the value of DEC?
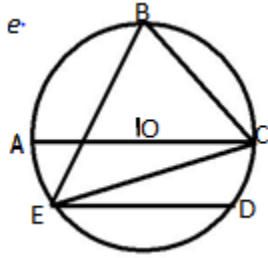
(1)35
(2)55
(3)45
(4)25

25. A new flag is to be designed with six vertical stripes using some or all of the colours – yellow, green, blue and red. The number of ways in which this can be done such no two adjacent stripes have the same colours is_____.
(1)12 × 81
(2) 16 × 192
(3) 20 × 125
(4) 24 × 216

26. How many integers, greater than 999 but not greater than 40000, can be formed with the digits, 0, 1, 2, 3 and 4, if repetition of digit is allowed?
(1)499
(2)500
(3)376
(4)375

Directions for questions 27 and 28: Answer the questions on the information given below:-
The figure below shows the plan of town. The streets are right angles to each other. A rectangular park (P) is situated inside the town with a diagonal road running through it. There is also prohibited region (D) in the town.
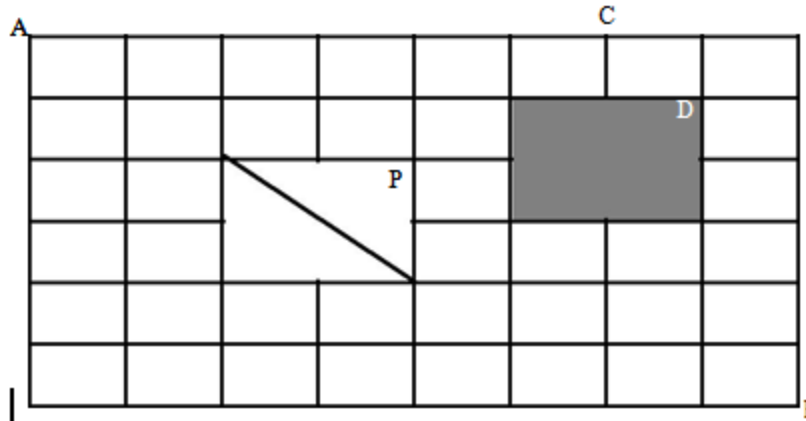
27. Neelam rides her bicycle from her house at A to her club at C via B taking as shortest path.Then the number of shortest paths that can be chosen is
(1)1170
(2)630
(3)792
(4)1200

28. Neelam rides her bicycle from her house at A to her office at B taking the shortest path. Then the number of possible shortest paths she can choose is
(1)60
(2)75
(3)45
(4)90

Directions for questions 29 to 34: Answer these questions which are independent of each other

29. In a certain store, the profit is 320% of the cost. If the cost increases by 25% but the selling price remains constant, approximately what percentage of the selling price is the profit?
(1)30%
(2)70%
(3)100%
(4)250%

30. A vendor bought toffees at 6 for a rupee. How many for a rupee must he sell to gain 20%?
(1)3
(2)4
(3)5

31. A and B together have Rs. 1210. If 4/15 of A's amount is equal to2/5 of B's amount, how much amount does B have
(1)Rs 460
(2)Rs 484
(3)Rs 550
(4)Rs 664

32. What is the sum of all the two-digit numbers which when divided by 7 gives a remainder 3?
(1)234
(2)676
(3)1121
(4)636

33. Let A and B be two solid spheres such that the surface area of B is 300% higher than the surface area of A. The volume of A is found to be k% lower than the volume of B. The value of k must be
(1)85.5
(2)92.5
(3)90.5
(4)87.5

34. In a 4000 meter race around a circular stadium having a circumference of 1000 meters, the fastest runner and the slowest runner reach the same point at the end of the 5th minute, for the first time after the start of the race. All the runners have the same starting point and each runner maintains a uniform speed throughout the race. If the fastest runner runs at twice the speed of the slowest runner, what is the time taken by the fastest runner to finish the race?
(1)20 min
(2)15 min
(3)10 min
(4) 5 min