CAT 2018 Slot 2 Quantitative Aptitude

Q - 1. Points A, P, Q and B lie on the same line such that P, Q and B are, respectively, 100 km, 200 km and 300 km away from A. Cars 1 and 2 leave A at the same time and move towards B. Simultaneously, car 3 leaves B and moves towards A. Car 3 meets Car 1 at Q, and Car 2 at P. If each car is moving in uniform speed then the ratio of the speed of Car 2 to that of Car 1 is

A. 1 : 4
B. 2 : 9
C. 1 : 2
D. 2 : 7

Q-2. Let a1, a2, ... , a52 be positive integers such that a1 < a2 < ... < a52. Suppose, their arithmetic mean is one less than the arithmetic mean of a2, a3, ..., a52. If a52 = 100, then the largest possible value of a1 is

A. 48
B. 20
C. 45
D. 23

Q - 3. There are two drums, each containing a mixture of paints A and B. In drum 1, A and B are in the ratio 18 : 7. The mixtures from drums 1 and 2 are mixed in the ratio 3 : 4 and in this final mixture, A and B are in the ratio 13 : 7. In drum 2, then A and B were in the ratio

A. 251 : 163
B. 239 : 161
C. 220 : 149
D. 229 : 141

Q - 4 On a triangle ABC, a circle with diameter BC is drawn, intersecting AB and AC at points P and Q, respectively. If the lengths of AB, AC, and CP are 30 cm, 25 cm, and 20 cm respectively, then the length of BQ, in cm, is (TITA)

Q - 5 Let t1, t2,… be real numbers such that t1+ t2 +... + tn = 2n2 + 9n + 13, for every positive integer n ≥ 2. If tk=103, then k equals (TITA)

Q - 6 From a rectangle ABCD of area 768 sq cm, a semicircular part with diameter AB and area 72π sq cm is removed. The perimeter of the leftover portion, in cm, is

A. 88 + 12π
B. 80 + 16π

C. 86 + 8π
D. 82 + 24π

Q - 7 If N and x are positive integers such that NN = 2160 and N2 + 2N is an integral multiple of 2x, then the largest possible x is (TITA)

Q - 8 A chord of length 5 cm subtends an angle of 60° at the centre of a circle. The length, in cm, of a chord that subtends an angle of 120° at the centre of the same circle is

A. 2π
B. 5√3
C. 6√2
D. 8

Q - 9 If p^3 = q^4 = r^5 = s^6, then the value of log s (pqr) is equal to

A. 24/5
B. 1
C. 47/10
D. 16/5

Q - 10. In a tournament, there are 43 junior level and 51 senior level participants. Each pair of juniors play one match. Each pair of seniors play one match. There is no junior versus senior match. The number of girl versus girl matches in junior level is 153, while the number of boy versus boy matches in senior level is 276. The number of matches a boy plays against a girl is (TITA)

Q - 11. A 20% ethanol solution is mixed with another ethanol solution, say, S of unknown concentration in the proportion 1:3 by volume. This mixture is then mixed with an equal volume of 20% ethanol solution. If the resultant mixture is a 31.25% ethanol solution, then the unknown concentration of S is

A. 50%
B. 55%
C. 48%
D. 52%

Q - 12. The area of a rectangle and the square of its perimeter are in the ratio 1 : 25. Then the lengths of the shorter and longer sides of the rectangle are in the ratio

A. 3 : 8
B. 2 : 9
C. 1 : 4

D. 1 : 3

Q - 13. The smallest integer n for which $4n > 1719$ holds, is closest to

A. 33
B. 39
C. 37
D. 35

Q - 14 The smallest integer n such that $n3 - 11n2 + 32n - 28 > 0$ is (TITA)

Q - 15. A parallelogram ABCD has an area 48 sqcm. If the length of CD is 8 cm and that of AD is s cm, then which one of the following is necessarily true?

A. $s \geq 6$
B. $s \neq 6$
C. $5 \leq s \leq 7$
D. $s \leq 6$

Q - 16The value of the sum 7 x 11 + 11 x 15 + 15 x 19 + ... + 95 x 99 is

A. 80707
B. 80751
C. 80730
D. 80773

Q - 17 On a long stretch of east-west road, A and B are two points such that B is 350 km west of A. One car starts from A and another from B at the same time. If they move towards each other, then they meet after 1 hour. If they both move towards the east, then they meet in 7 hrs. The difference between their speeds, in km per hour, is (TITA)

Q - 18. If the sum of squares of two numbers is 97, then which one of the following cannot be their product?

A. 64
B. -32
C. 16
D. 48

Q - 19. A jar contains a mixture of 175 ml water and 700 ml alcohol. Gopal takes out 10% of the mixture and substitutes it by water of the same amount. The process is repeated once again. The percentage of water in the mixture is now

A. 25.4
B. 20.5
C. 30.3
D. 35.2

Q - 20 Points A and B are 150 km apart. Cars 1 and 2 travel from A to B, but car 2 starts from A when car 1 is already 20 km away from A. Each car travels at a speed of 100 kmph for the first 50 km, at 50 kmph for the next 50 km, and at 25 kmph for the last 50 km. The distance, in km, between car 2 and B when car 1 reaches B is (TITA)

Q - 21. A tank is emptied everyday at a fixed time point. Immediately thereafter, either pump A or pump B or both start working until the tank is full. On Monday, A alone completed filling the tank at 8 pm. On Tuesday, B alone completed filling the tank at 6 pm. On Wednesday, A alone worked till 5 pm, and then B worked alone from 5 pm to 7 pm, to fill the tank. At what time was the tank filled on Thursday if both pumps were used simultaneously all along?

A. 4 : 12 PM
B. 4 : 24 PM
C. 4 : 48 PM
D. 4 : 36 PM

Q - 22. Ramesh and Ganesh can together complete a work in 16 days. After seven days of working together, Ramesh got sick and his efficiency fell by 30%. As a result, they completed the work in 17 days instead of 16 days. If Ganesh had worked alone after Ramesh got sick, in how many days would he have completed the remaining work?

A. 12
B. 14.5
C. 13.5
D. 11

Q - 23. If a and b are integers such that $2x^2 - ax + 2 > 0$ and $x^2 - bx + 8 \geq 0$ for all real numbers x, then the largest possible value of $2a - 6b$ is (TITA)

Q - 24. The scores of Amal and Bimal in an examination are in the ratio 11 : 14. After an appeal, their scores increase by the same amount and their new scores are in the ratio 47 : 56. The ratio of Bimal's new score to that of his original score is

A. 3:2
B. 4:3

C. 5:4
D. 8:5

Q - 25. A triangle ABC has area 32 sq units and its side BC, of length 8 units, lies on the line x = 4. Then the shortest possible distance between A and the point (0,0) is

A. $4\sqrt{2}$ units
B. $2\sqrt{2}$ units
C. 4 units
D. 8 units

Q - 26. How many two-digit numbers, with a non-zero digit in the units place, are there which are more than thrice the number formed by interchanging the positions of its digits?

A. 5
B. 8
C. 7
D. 6

Q - 27. A water tank has inlets of two types A and B. All inlets of type A when open, bring in water at the same rate. All inlets of type B, when open, bring in water at the same rate. The empty tank is completely filled in 30 minutes if 10 inlets of type A and 45 inlets of type B are open, and in 1 hour if 8 inlets of type A and 18 inlets of type B are open. In how many minutes will the empty tank get completely filled if 7 inlets of type A and 27 inlets of type B are open? (TITA)

Q - 28. Gopal borrows Rs. X from Ankit at 8% annual interest. He then adds Rs. Y of his own money and lends Rs. X+Y to Ishan at 10% annual interest. At the end of the year, after returning Ankit's dues, the net interest retained by Gopal is the same as that accrued to Ankit. On the other hand, had Gopal lent Rs. X+2Y to Ishan at 10%, then the net interest retained by him would have increased by Rs. 150. If all interests are compounded annually, then find the value of X + Y. (TITA)

Q- 29The arithmetic mean of x, y and z is 80, and that of x, y, z, u and v is 75, where u = (x+y)/2 and v = (y+z)/2. If $x \geq z$, then the minimum possible value of x is (TITA)

Q - 30. Let f(x)=max{5x, 52 - 2x2}, where x is any positive real number.Then the minimum possible value of f(x) is (TITA)

Q - 31. For two sets A and B, let AΔB denote the set of elements which belong to A or B but not both. If P = {1,2,3,4}, Q = {2,3,5,6,}, R = {1,3,7,8,9}, S = {2,4,9,10}, then the number of elements in (PΔQ)Δ(RΔS) is

A. 7
B. 8
C. 9
D. 6

Q - 32 If A = {6^2n - 35n - 1: n = 1,2,3,...} and B = {35(n-1) : n = 1,2,3,...} then which of the following is true?

A. Neither every member of A is in B nor every member of B is in A
B. Every member of A is in B and at least one member of B is not in A
C. Every member of B is in A.
D. At least one member of A is not in B

Q - 33. The strength of a salt solution is p% if 100 ml of the solution contains p grams of salt. If three salt solutions A, B, C are mixed in the proportion 1 : 2 : 3, then the resulting solution has strength 20%. If instead the proportion is 3 : 2 : 1, then the resulting solution has strength 30%. A fourth solution, D, is produced by mixing B and C in the ratio 2 : 7. The ratio of the strength of D to that of A is

A. 3:10
B. 1:3
C. 2:5
D. 1:4