2017 CAT

Section : Quantitative Ability

DIRECTIONS for the question: *Solve the following question and mark the best possible option.*

Question No. : 67

Ramu mixes 2 litres of mineral water costing Rs. 15 per litre with 18 litres of milk that he bought for Rs. 900. After selling 2 litres of this mixture to Shamu, Ramu adds tap water so that the ratio of milk to tap water is 9:10. If tap water is free and Ramu claims to sell at cost, what is his profit?

A) 95%   B) 115%   C) 104%   D) 84%

Question No. : 68

An alloy of copper and aluminum has 40% copper. An alloy of Copper and Zinc has Copper and Zinc in the ratio 2: 7. These two alloys are mixed in such a way that in the overall alloy, there is more aluminum than Zinc, and copper constitutes x% of this alloy. What is the range of values x can take?

A) 30% < x < 40%   B) 31% < x < 40%   C) 33.33% < x < 40%   D) 32.25% < x < 40%

Question No. : 69

The average age (in years) of a class is twice the number of students in the class. A student, X leaves the class and the average age is still twice the number of students in the class. Now another student Y leaves the class and the average is still the twice the number of students in the class. If the ratio of the ages of X and Y is 19 : 17, then find the average age of the class, if one more student Z of age 16 years leaves the class.

A) 10   B) 15   C) 16   D) 18

Question No. : 70

If $f(x) = x^5 - x^4 - x^2 - x$, and a, b, c are the roots of the cubic equation $x^3 - x^2 - 1 = 0$, then what is the sum of $f(a)$, $f(b)$ and $f(c)$?

A) – 3   B) – 1   C) 0   D) 2

Question No. : 71

Let N be the number of ordered pairs (x,y) of integers (positive, negative, or zero) such that $x^2 + xy + y^2 \le 2007$, then N is

A) Odd   B) Even   C) Prime   D) None

Question No. : 72

In a class, if 50% of the boys were girls, then there would be 50% more girls than boys. What percentage of the overall class is girls? (in numerical value)

A) 20   B)   C)   D)

Question No. : 73

If $2a^2+17b^2+8c^2-6ab-20bc=0$ and $abc \ne 0$, then what is the value of $\frac{a+b-c}{a+b+c}$?

A) 2/3   B) 1/3   C) 3/4   D) Cannot be determined

Question No. : 74

If a, b and c are real numbers such that a + b + c = 25 and $ab + bc + ca = 75$, what is the largest value that a can have?

A) 65/3   B) 55/3   C) 25/3   D) None of these

Question No. : 75

The HCF and LCM of two integers a and b are x and y such that xy = 54. Also the HCF and LCM of ka and ℓb, where k and ℓ are integers, is 18. Therefore b/a can be:

A) 2/3   B) 1/6   C) 1/3   D) Both 1 and 2

Question No. : 76

A man works in a building located 7 blocks east and 8 blocks north of his home. He reaches his office and then walks to a supermarket located 2 blocks east and 4 blocks north of his home. If all the streets in the rectangular pattern are available to him for walking and he always takes the shortest route, how many different routes can he take to go from his house to the supermarket via his office? (in numerical value)

A) 810810   B)   C)   D)

Question No. : 77

A page is torn from a booklet. After this is done, the sum of the page numbers on the remaining pages is 1000. What are the page numbers on the page which was torn?

A) 17 and 18   B) 18 and 19   C) 41 and 42   D) 42 and 43

Question No. : 78

A, B, C are decimal numbers with MOD $(x) = x$ truncated to the nearest integer less than or equal to x. If p = MOD (A + B + C) and q = MOD (A) + MOD (B) + MOD (C), then the maximum value that $p - q$ can attain is

A) 0   B) 1   C) 2   D) 3

Question No. : 79

What is the sum of all three-digit multiples of 3 or 5?

A) 263,498   B) 230,850   C) 198,000   D) 233,168

Question No. : 80

5-digit integers are formed by using the digits 0, 1, 2, 3, 5, 6 and 8 exactly once. What is the sum of the last two digits of the sum of all the integers formed? (in numerical value)
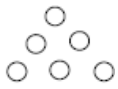
A)   B)   C)   D)

Question No. : 81

A triangle number counts the objects that can form an equilateral triangle. For example 6 is a triangle number:

Given that p is prime, for what value of p is $(8p +1)$ a triangle number?

A) 13   B) 19   C) Both 1 and 2   D) None of these

Question No. : 82

Tom and Jerry left New York simultaneously towards New Jersey. Speed of Tom is 15 km/hr and the speed of Jerry is 12 km km/hr. Half an hour later, Spike started from New York towards New Jersey on the same road in the same direction. After some time he overtook Jerry and 90 min further, he overtook Tom. What is Spike's speed (in kmph)?

A) 16 km/hr   B) 18 km/hr   C) 20 km/hr   D) 24 km/hr

Question No. : 83

There are 2 signals on SB Road, which are 1 km apart and are always out of sync with each other. A pedestrian is trying to measure her walking speed by counting the number of spurts of opposing traffic that she sees as she walks the distance between the two signals. She sees traffic spurts coming in every 50 s. She knows that the signal is timed to turn on every 60 s. If the traffic is moving at 30 km/h, then what speed is she walking at?

A) 4 km/h   B) 5 km/h   C) 6 km/h   D) 7 km/h

Question No. : 84

A water tank is in the shape of an inverted right circular cone. The tank is standing on horizontal ground on its vertex. The axis of the conical tank is perpendicular to the horizontal surface of ground. The height of the tank is 3 m. The tank is completely filled with water, and the volume of the water is 27 L. There are three outlet taps, one at the bottom, second at a height of 1 m, and the third at a height of 2 m. The rate of outflow of each of the three taps is 1 L/min. If all the three taps are opened simultaneously at 12 noon, at what approximate time will the tank get completely empty?

A) 12:30 pm   B) 12:11 pm   C) 1:12 pm   D) 1:30 pm

Question No. : 85

$t_1, t_2, t_3, ..., t_{n-1}, t_n$ is a sequence such that $t_1 = 2$ & $t_n = t_{n-1} + 2n - 2$ for $n \geq 2$. Find t_{99}. (in numerical value)

A) 9704   B)   C)   D)

Question No. : 86

From a solid iron right circular cone of base radius 2 cm, a hemisphere of diameter 2 cm and centre coinciding with the centre of the base is scooped out. The resultant object is then dropped into a right circular cylinder of inner diameter 6 cm and height 10 cm. Water is then poured into the cylinder to fill it up to the brim. If the height of the cone is 5 cm, what is the volume of the water poured into the cylinder?

A) $80\pi \ cm^3$ B) $250\pi/3 \ cm^3$ C) $270\pi/4 \ cm^3$ D) $84\pi \ cm^3$

Question No. : 87

Let ABCD be a square and let P be a point on segment CD such that DP: PC = 1: 2. Let Q be a point on segment AP such that $\angle BQP = 90^0$. Then the ratio of the area of quadrilateral PQBC to the area of the square ABCD is

A) $\frac{31}{60}$ B) $\frac{37}{60}$ C) $\frac{39}{60}$ D) $\frac{41}{60}$

Question No. : 88

Manoj and Akhilesh are two non-identical twins. Both of them own plots of square shape in the *Peer Moshalla* Colony. Manoj's house has a land area double in size to that of Akhilesh's house. Manoj's house is designed as a cubical house with the roof in the shape of a square Pyramid having slant height 9 m. Akhilesh built his house in the shape of a cylinder of height 8 m topped up by a right circular conical roof of diameter 10 m. What is the height of Manoj's house (Given each person covers the maximum possible land area while building house)?

A) √31 m   B) 8 + 2√14 m   C) 10√2 + √31 m   D) Cannot be determined

Question No. : 89

A shopkeeper bought an article for Rs.1000 and marked its price as Rs.2160. He gave three successive discounts of a%, b% and c%, where a + b + c = 50. If he made a profit of x% finally, how many of the following ranges contain values which are NOT possible values of x? (in numerical value)

(i) 6 < x < 10
(ii) 14 < x < 20
(iii) 20 < x < 24
(iv) 25 < x < 26

A) 2   B)   C)   D)

Question No. : 90

The headlights of a car which are at 2 ft distance from each other form a cone of light each. These cones of lights intersect each other at some distance. Two smaller cones vertically opposite to each other are formed at this point of intersection; the one towards the car is darker while the one on the other side is brighter than the original light of each headlights, the radius of the smaller being ½ a foot. If at a distance of ten feet from the car the volume of the darker cone is 8 times the brighter one, to what distance does the darker cone extend ?
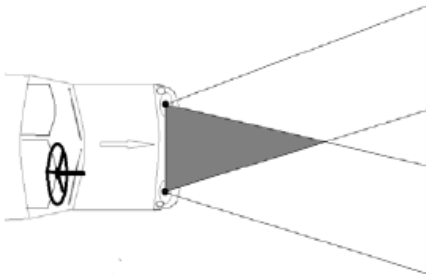
A) 6.66 ft   B) 9 ft   C) 12 ft   D) 13.33 ft

Question No. : 91

Ravi wants to build a digester for a biogas plant on a rectangular plot of dimensions 28.8 ft. × 15.7 ft. so that a third of the height of the digester is below ground. The digester is in the form of a cylinder, with height ¼ of its diameter, surmounted by a hemispherical dome and has volume 792 cu. ft. The earth that is dug out is spread evenly across the remainder of the field. (π = 3.14)

The depth of the hole dug in the field is what percent of the total height of the digester?

A) 16.66%   B) 33.33%   C) 25%   D) 66.66%
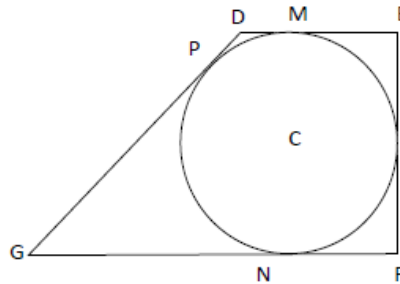
Question No. : 92

A manufacture sells an article to a wholesale dealer at a loss of 20%. The wholesale dealer sells it to a shopkeeper at a profit of 25% and the shopkeeper sells it to a customer for Rs. 45000 at a loss of 10%. Then, the cost price of the article to the manufacture is (in Rs.)

A) 50000   B)   C)   D)

Question No. : 93

A circle with centre C is inscribed in a trapezium DEFG. If DM = 1 cm, GN = 4 cm and the measure of ∠DEF = ∠EFG = 90°, then what is the radius of the circle.

A) 2cm   B) 2.5cm   C) 2.25cm   D) 3cm

Question No. : 94

In a rectangle of size 7 cm by 14 cm, quarter circles of radius 7 cm are drawn at each of the 4 vertices. What is the area of the rectangle which is not covered by any of the circles (in cm^2)?

A) 2.17   B) 6.73   C) 4.76   D) 12.44

Question No. : 95

What is the value of $\sqrt{10^{\left[2+\frac{1}{2}\log_{10}16\right]}}$?

A) 30   B) 35   C) 40   D) 20

Question No. : 96

What is the value of the infinite series $S = \dfrac{2}{5} + \dfrac{6}{25} + \dfrac{12}{125} + \dfrac{20}{625} + \dfrac{30}{3125} + \ldots ?$

1. $\dfrac{13}{16}$

2. $\dfrac{4}{5}$

3. $\dfrac{25}{32}$

4. $\dfrac{39}{50}$

(write the answer key)

A) 3   B)   C)   D)

Question No. : 97

The ratio of the ages of a husband and his wife when they got married was 6 : 5. 4 years and 6 years after their marriage they had their 1st and 2nd children. The sum of the present ages of the husband and wife is 6.4 times the sum of the present ages of their children. The average age of the family at present is 18.5 years. Find the ratio of the ages of the husband and wife when their second child was born.

A) 7 : 6   B) 15 : 13   C) 6 : 7   D) None of these

Question No. : 98

A survey revealed that 800 people owned shares of company X, 1000 owned shares of company Y and 600 owned shares of company Z. It was found that 325 people owned shares of companies X and Z and 300 owned shares of companies Y and Z. 150 people owned shares of all three companies. If S represents the total number of people who own shares of any of these 3 companies, then what is the difference between the maximum and minimum value of S?

A) 700   B) 475   C) 825   D) 350

Question No. : 99

The simple interest accrued on an amount of Rs. 25,000/– at the end of three years is Rs. 7,500/–. What would be the compound interest accrued on the same amount at the same rate in the same period?

A) Rs. 7,750/–   B) Rs. 8,275/–   C) Rs. 8,500/–   D) Rs. 8,250/–

Question No. : 100

A and C together can complete a piece of work in 12 days, which C and D together can complete in 24 days. If B and D work together, they can complete the same work in 15 $^5/_{13}$ days. A worked at the job for 4 days, then D took over and worked at it for 12 days; C then took over and worked at it for 14 days before B completed the job in 5 days. How long will they take to complete the job if all four of them work together?

A) 14 $^6/_{13}$ days   B) 4 $^2/_7$ days   C) 2 $^{17}/_{29}$ days   D) 6 $^{66}/_{89}$ days