CDC 06 2022 QA

Q 1. A bookseller sells three types of notebooks - A, B and C. The product of the prices (in Rs.) of three types is equal to 6400. The prices of A and B are in the ratio 2 : 5 respectively. If the bookseller decides to increase the prices of A and B by Rs. 12 each, keeping the price of C unchanged, the product is then changed to 25,600. Find the sum of the original prices (in Rs.) of a piece of A, B and C each.

1) 56

2) 68

3) 88

4) 64

Q 2. Four persons Pat, Quinn, Ryan and Tim can complete a work in 9, 12, 15 and 20 days respectively. One of them starts the work and it is continued on a rotation basis, with all the four taking turns and only one person working per day. Any one of the four can start work on the first day. Which of the following is the complete set of people, who can work on the first day such that the work begins and ends with the same person?

1) Pat, Quinn

2) Quinn, Ryan

3) Pat, Quinn, Ryan

4) Pat, Quinn, Tim

Q 3. A regular hexagon ABCDEF has a side length of 6 cm. BF and BE are diagonals of the hexagon which intersect the diagonal AD at points P and Q respectively. What is the ratio of the area of triangle BPQ to that of the quadrilateral ABDF?

1) 1 : 6

2) 1 : 8

3) 1 : 10

4) 1 : 12

Q 4. f(x) is a quadratic function with the coefficient of highest power of x as 1 and has two real roots. f(0) = 9, and f(−9) = f(35). If the minimum value of f(x) is k, then find the value of k^2.

Q 5. Let abcde be a 5-digit number. If a + b + c + d = 16, b + c + d + e = 17 and d = e + 3. Then the highest possible 5-digit number satisfying the above conditions is

Q 6. A circle of radius 13 cm is circumscribed about a quadrilateral ABCD. If AB = 10 cm and BC = 24 cm, then find the maximum possible area (in sq. cm) of the quadrilateral ABCD.

1) 288

2) 289

3) 324

4) 256

Q 7. Two runners Ram and Ravi simultaneously start running around a circular track. They run in the same direction. Ram runs at 9 m/s and Ravi runs at 's' m/s. If they cross each other at exactly two points on the circular track and 's' is a natural number, how many values can 's' take?

1) 3

2) 4

3) 6

4) 5

Q 8. A dishonest shopkeeper mixes 250 grams of sand in 1 kilogram of rice. 350 grams of the mixture is spilled during transportation. He then uses a faulty balance that reads 1 kilogram for 800 gram while selling the mixture which is listed at the cost price of rice. If rice costs Rs. 70 per kg and sand costs Rs. 20 per kg, what is his overall profit/loss percentage during the entire transaction?

1) 12.5% Profit

2) 5% Profit

3) 5% Loss

4) No profit, no loss

Q 9. Let $\log_a(\log_b(\log_c p)) = 0$, where a, b and c assume distinct values among, 4, 8 and 16 only. If the product of all possible values of 'p' is equal to 2^n, then what is the value of 'n'?

Q 10. For natural numbers p, q and r, $81 \times 7^4 \times p = 3^5 \times 49 \times q^r$. If $40 > p > q > r$, then what is the maximum possible value of p + q + r?

1) 48

2) 50

3) 31

4) 32

Q 11. In a group of four friends – A, B, C and D, the ratio of the weight of A to the weight of B is 3 : 2. Ratio of the weight of B to the weight of C is 5 : 6. If the weight of D, which is half the weight of A, is 37.5 kg, find the weight (in kg) of C.

1) 60

2) 50

3) 56

4) 64

Q 12. Let |m – 3| + |n – 4| = 6, where m, n are one digit whole numbers. The maximum value of m × n is

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Q 13. ABCD is a rectangle in which AB = 8 and BC = 6 cm. If a perpendicular is drawn from B to the diagonal AC which intersects DC at E, then the ratio of DE : EC is

1) 5 : 7

2) 3 : 5

3) 7 : 9

4) 9 : 11

Q 14. A worker works for 7 days on a project that has two tasks - X and Y. Starting from the second day, his daily wage for task X increases by 8% of the first day's wage for X, while his daily wage for task Y increases by 5% of the first day's wage for Y. The total wages of the worker for the first 3 days is Rs.4,140 and that for the last 3 days is Rs.5,100. What was the worker's average wage per day (in Rs.) during the week?

Q 15.

Let a_n be a sequence such that $a_n = \frac{a_{n-1}}{a_{n-2}}$ for each positive integer $n \geq 3$ where $a_1 = 2$ and $a_2 = 3$, then the value of $|a_{2007} - a_{2008}|$ is equivalent to

1) $3a_6$

2) $3(a_4 - a_5)$

3) $2a_4$

4) $2(a_2 - a_1)$

Q 16. Points A, B and C are along a straight line such that B lies between A and C. Ram starts from A towards C and after reaching C, he returns along the same line. Shyam starts from B towards A and after reaching A, returns along the same line. Ram and Shyam start simultaneously and the second time they meet is at point B. If the distance from A to B is 60 m and the ratio of speeds of Ram and Shyam is 4:3, find the distance between B and C.

1) 60 m

2) 150 m

3) 50 m

4) Cannot be determined

Q 17.

The sum of distinct real roots of the equation $\left(x+\frac{1}{x}\right)^2-4\left(x+\frac{1}{x}\right)+3=0$ is

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Q 18. Pipes A and B are inlet pipes while pipe C is an outlet pipe. Pipe A supplies water at 45 liters/hour. Pipe B can fill a tank in 3 hours while pipe C can empty it in 12 hours. All the pipes are simultaneously opened and the tank gets filled in 1 hour. What is the rate of flow of pipe B?

1) 20 liters/hour

2) 30 liters/hour

3) 24 liters/hour

4) 25 liters/hour

Q 19.

How many integral values of x satisfy the inequality $\frac{\sqrt{2x+6}}{1-x}>1$?

Q 20. ABCD is a square and E is a point on AD such that ∠CED = 4 × ∠ACE. If CE intersects diagonal BD at F, then find ∠EFB (in degrees).

Q 21. There are 40 students in a class. All the students play at least one of the three games among football, cricket and badminton. Anyone who plays football also plays cricket. No one plays football and badminton and 30% of the students play cricket and badminton. The number of students who play exactly one of the three games is more than the number of students who play more than one of the three. If the number of students who play only Badminton is minimum, then what is the maximum number of students who play both Cricket and Football?

1) 5

2) 6

3) 8

4) 7

Q 22. A shopkeeper hiked the price of an article by x% and then gave x% discount and the price of the article decreased by Rs.3,000. Once again the price of the article was increased by x/2% and then decreased by x/2% and it was finally sold at Rs.71,280. What can be the initial price of the article?

1) Rs.78,500

2) Rs.75,000

3) Rs.72,000

4) Rs.86,000