Q 1. Sequence A is defined as $A_n = A_{n-1} + 6$, $A_2 = 15$ and sequence B is defined as $B_n = B_{n-1} - 7$, $B_4 = 106$. If $A_k > B_k$, then find the smallest value that k can take.

1) 13

2) 10

3) 7

4) 11

Q 2. Ramesh starts from city A towards city B in his car at a certain speed. Due to a broken road 50 km away from city A, the speed of his car decreased to 3/5 of the original speed. Because of this, Ramesh reached city B late by 1 hour 40 minutes. Had the broken road been 100 km away from city A and since then he would have maintained 3/5 of the original speed, he would have reached city B late by 1 hour. What was the original speed (in km/h) of his car?

1) 25

2) 50

3) 80

4) 100

Q 3. A scientist knows that the maximum amount of a solute that can be dissolved in 100 g of water is 20 g. If more solute is added it remains undissolved and settles down. It is known that water evaporates at the rate of 280 g/hour from 1 kg of the mixture which contains 5% solute. If the scientist starts boiling the mixture, after how much time (in hours) will the solute start depositing at the base?

Q 4. Annual income of Adam is Rs.2,00,000 and he saves Rs.40,000 annually. Savings up to 15% of the income are exempted from the tax and rest of the savings are charged at the rate of 5% tax. On the remaining income, tax is calculated at 10% up to Rs.1,00,000 and 20% for the rest of the income. What is the annual tax (in Rs.) paid by Adam?

Q 5. If points A, B, C and D are on the circumference of a circle of radius 4 cm such that ABC is an equilateral triangle and AD is a diameter of the circle, then BD + AC (in cm) is

1) $4(1 + \sqrt{3})$

2) $8(1 - \sqrt{3})$

3) $8(1 + \sqrt{3})$

4) 4(1 − √3)

Q 6. Tara, Mira and Sara completed some work together in 30 days and received a total payment of Rs. 45,000. Tara took one-fifth of the total money, Mira took one-third and Sara took the remaining. In how many days could Tara and Sara complete the work if Mira was not working?

1) 52 days

2) 45 days

3) 56 days

4) 40 days

Q 7. Let N be a 5-digit number such that the sum of the digits of N is 7 and three of these 5 digits are 0, 1, and 2. How many such numbers are possible?

Q 8.

If $\log_2\left(3+\log_3\left(4+\log_4\left(\frac{1}{2}+\log_{625}(x-2)\right)\right)\right)-2=0$, then the value of 5x is

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Q 9. The railway ticket for a child costs half the full ticket but the reservation charges are the same for half as well as full ticket. Mr. and Mrs. Sharma along with their 7 years old son purchased three tickets for a journey between two stations and paid a total of Rs.812. If the total cost of the ticket for the child alone is Rs.176, then what are the reservation charges per ticket (in Rs.)?

1) 24

2) 34

3) 36

4) 28

Q 10. Number of integer values for which the inequality $(3x - 1)(x - 3) > (2x^2 - 8x + 2)$ does not hold true is/are:

1) 0

2) 1

3) 2

4) More than 2

Q 11. A cube with each side equal to 1600 units is cut into smaller cuboids with identical integral dimensions in such a way that there is no wastage. In how many ways can this be achieved if the smaller cuboids cannot be cubes with equal dimensions?

Q 12. ABCD is a quadrilateral and AB is parallel to CD. The point E is on AB such that AE : EB : CD = 1: 2 : 2. If the area of triangle ADE is 25 sq. cm, then the area (in sq. cm) of the quadrilateral ABCD is

Q 13. If $f(x) + f(x - 1) = x^2$ for all real values of x such that $f(29) = 80$, then find $f(80)$.

Q 14. Sahil, a merchant, marks up his goods 20% higher than the cost price. If he offers 15% discount on 3/5th of the total goods and 10% discount on 1/4th of the total goods. If Sahil gets an overall profit of 5%, then what percentage of discount should be given by Sahil to customers on the remaining goods?

1) 9.33%

2) 8.67%

3) 5.33%

4) 6.67%

Q 15. The number of real solutions of the equation $x^2 - 5|x - 1| - 1 = 0$ is

1) 1

2) 2

3) 3

4) 4

Q 16. Mithilesh calculates his average marks in seven subjects in which maximum marks awarded were 99. By mistake he writes the digits of the scores of two subjects in the reverse order of original marks thereby increasing the average by 9 marks. If the incorrect numbers are in the ratio 8 : 7, what is the total of the original scores in the two subjects?

1) 115

2) 131

3) 123

4) 117

Q 17. The ratio of the price of an orange to that of an apple is 5 : 3 whereas the ratio of the weight of an orange to that of an apple is 4 : 1. The weight of a packet of apples is twice the weight of a packet of oranges. If Jia buys 2 packets of apples and 4 packets of oranges such that the price of each kind of packet was an integer, then what total price (in Rs.) she could have paid?

1) 138

2) 204

3) 102

4) 85

Q 18. Let ABC be a right-angled triangle with in radius 3 cm and circumradius 8 cm. The area (in sq. cm) of the triangle ABC is

1) 57

2) 56.5

3) 57.5

4) 58

Q 19. Hima and Jaya run a 15 km race on a circular track of length 1500 m. They complete one round in 300 seconds and 600 seconds respectively. After how much time from the start will the faster person meet the slower person for the last time?

1) 1 hour

2) 1 hour 40 minutes

3) 50 minutes

4) 40 minutes

Q 20. If number of divisors of a natural number n is 15, then number of ordered pairs (n, m) which satisfy the equation $n - m^2 = 44$ where m is a positive integer, is equal to

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Q 21. The area of a regular hexagon ABCDEF is equal to the area of an equilateral triangle of side 18 cm. Find the length (in cm) of diagonal AC of the regular hexagon.

1) 6√2

2) 9√2

3) 6√3

4) 9√3

Q 22. Sumit deposited some money in scheme A, which pays 15% interest per annum compounded annually. If scheme B provides simple interest at the same rate instead of compound interest, he receives Rs. 4,800 as interest after 2 years. Find the total amount (in Rs.) that he received from scheme A after 3 years.

1) 25,160

2) 24,334

3) 21,160

4) 23,716
