Q 1.

If $4 - \log_4 \sqrt{2+a} + 3\log_4 \sqrt{2-a} = \log_4 \dfrac{1}{\sqrt{4-a^2}}$, then the value of '16a' is

Q 2. Two-fifths students are engineering aspirants and the rest are medical aspirants. If 5/16 of the engineering aspirants and 1/4th of the medical aspirants joined the coaching for the exam preparation and the total number of students without coaching is 1305, then 7/10 of the total students exceeds the number of students who are medical aspirants by:

Q 3. There are four identical glasses which have water in them. The volume of water in four glasses is 40%, 58%, 65% and 89%. The glasses are emptied in an empty container and then the same container is used to fill 50% volume of each glass with water. If the remaining water in the container is 208 ml, what is the final total quantity of water (in ml) in all the four glasses?

1) 1008

2) 720

3) 800

4) 960

Q 4. A pair of shoes costs 12 times the cost of a pair of socks. The shopkeeper earns a profit of 10% from the sale of the pair of shoes whereas the total profit from selling both the shoes and the socks was 15%. If there is a profit of Rs.45 on selling the pair of socks, then find the selling price (in Rs.) of the pair of shoes.

1) 840

2) 600

3) 792

4) 720

Q 5. If a pack of 3 pens, 5 pencils and 4 erasers costs as much as a pack of 2 pens, 5 pencils and 7 erasers or a pack of 10 pencils and 6 erasers, then the cost of any one of the packs is equal to the cost of _____ erasers.

1) 18

2) 21

3) 20

4) 19

Q 6. Titu, Bitu, and Ritu are having a circular pizza with five slices. Each slice has a different topping. They divide the slices such that each of them gets at least one slice but none of them gets two adjacent slices. In how many ways could they divide the slices of the pizza?

1) 30

2) 24

3) 25

4) 31

Q 7. At a school picnic Rose milk is prepared by mixing 24 liters of rose syrup with 72 liters of milk. X liters of the mixture is taken out and 16 liters of rose syrup and 24 liters of milk are added to the remaining mixture. The final mixture contains 35% rose syrup, find the quantity of the mixture (in liter) that was taken out.

1) 76

2) 82

3) 60

4) 65

Q 8. The sum of the roots of a quadratic equation $ax^2 + bx + c = 0$, where a, b, c are real numbers and $a \neq 0$, is 11 less than the product of the roots. If one root is 1 less than the other root, then the value of b/c is

1) −5/6 or 9/20

2) 5/6 or − 9/10

3) − 6/7 or 3/5

4) 5/6 or − 9/20

Q 9. Let N = abc be a perfect square number. If digit 'a' is increased by 1, 'b' is increased by '2' and 'c' is increased by '3', then new number formed is also a perfect square. Find the sum of digits of N.

Q 10. The students of class 10 of a school are divided into three sections - A, B and C. Out of the total students 25%, 35% and 40% students are in A, B and C respectively. If 5%, 3% and 7% students of A, B and C respectively fail in their half-yearly exam, then what is the percentage of students who passed in all?

1) 88.8%

2) 91.8%

3) 94.9%

4) 98.9%

Q 11. How many integral values of y satisfy the equation 2x + 3|y| = 100, where x is a natural number?

Q 12. Amit and Ben stay next to each other and study in the same college. Speed of Ben is 20% less than the speed of Amit. They start at the same time from their residences, the faster of the two reaches the college first, turns around and starts walking back. If Amit and Ben meet 200 m away from the home. What is the distance (in m) between their residences and their college?

Q 13. Asha and Bina run on a 540 m long circular track at a speed of 12 m/s and 18 m/s respectively. They start from the same point at the same time and run in opposite directions. Find the number of times they would have met when Bina covers 2916 meters.

Q 14. ABC is an equilateral triangle. O is the point of intersection of altitudes AD, BE and CF. If AO = 8 cm, then what is the area, in sq. cm, of the triangle ABC?

1) 24√3

2) 36√3

3) 48√3

4) 72√3

Q 15. If $f(x^2 - 2) = 5x^4 - 3bx^2 + 5c$ and $f(x - 3) = 2x^3 + 3cx - 2b$, then b + c is

1) −11

2) −17/2

3) −83/7

4) Cannot be determined

Q 16. Three friends A, B and C can solve a set of 600 questions each in 10 hrs, 15 hrs and 20 hrs respectively. The set of 600 questions is divided into two equal parts. A and B start solving the first 300 questions and C starts solving the last 300 questions. After 2 hrs A joins C and B is left alone with the first half. What is the time difference between the completion of the first and last half of the set?

1) 10 minutes

2) 30 minutes

3) 20 minutes

4) 15 minutes

Q 17.

If $x_0 = 1$ and $x^3_{n+1} = 99x^3_n$, n = 0, 1, 2, 3,..., then what is the last digit of $x_{99} + x_{111}$?

Q 18. A circle with center O has radius 25 cm. Chord AB of length 30 cm and chord CD of length 14 cm intersects at point E. If P and Q are the midpoints of chords AB and CD respectively and PQ = 12 cm, then the area (in sq. cm) of ΔPOQ is

1) 24√7

2) 16√14

3) 64√7

4) 32√14

Q 19. If −6 is a root of the equation $2x^2 + px - 18 = 0$, and the equation $p(x^2 + x) + (k + 1) = 0$ has equal roots, then the value of 'k' is:

1) 3/2

2) 5/4

3) 5/3

4) 4/3

Q 20.

ABCD is a square. P and Q are points on AB and BC respectively. The line through P parallel to BC and line through Q parallel to AB divide ABCD into two squares and two non-square rectangles. If the sum of the area of two squares is 3/4 of the area of square ABCD, then $\dfrac{AP}{PB} + \dfrac{PB}{AP}$ is

1) 3

2) 6

3) 4

4) 12

Q 21. Mr.Shah invested one half of his savings in an Insurance Policy that paid simple interest for 2 years and received Rs.36,000 as interest. He invested the remaining in a Mutual fund that paid compound interest, calculated annually, for 2 years at the same rate of interest and received Rs.38,700 as interest. What was the value (in Rs. lakh) of his total savings before investing in these two policies?

1) 1.2

2) 3.6

3) 2.4

4) 4.8

Q 22.

Find the area (in sq. units) of the region bounded by the curve $\left|x - 10^{20}\right| + \left|y - 30^{196}\right| = 20$.