Prime CAT 07 2022 QA

Q 1. ABC is a triangle. Points D, E and F are midpoints of AB, AC and BC respectively. Points P, Q and R are midpoints of DE, DF and EF respectively. The ratio of the area of parallelogram BDEF to that of triangle PQR is

1) 8 : 1

2) 4 : 1

3) 6 : 1

4) 16 : 1

Q 2.

If $\log_{\left(\frac{x+5}{3}\right)} 3 = \log_{\left(\frac{-1}{x+1}\right)} 3$, then x^2 equals:

1) 4

2) 9

3) 16

4) Either (1) or (3)

Q 3. Meera and Neeta have a certain number of candies with them. Meera gave Neeta two-thirds of her candies and Neeta later returned two-thirds of the candies that she had to Meera. This is called a dealing and it is seen that after any whole number of such dealings the ratio of the number of candies with Meera and Neeta is always the same and nobody eats the candies in between. If Meera initially has 96 candies more than Neeta, then how many candies did Meera initially have?

Q 4. Eight points are marked on a straight line and seven points are marked on another line which is parallel to the first. The number of straight lines, including these two, can be formed with these points is

1) 54

2) 56

3) 58

4) 60

Q 5. Let f(n) be a function defined as f(n + 2) = f(n + 1) + f(n) for all positive real values of 'n'. If f(1) = f(2) = 1, then find the highest common factor of f(8) and f(12).

1) 1

2) 2

3) 5

4) 3

Q 6. To do a certain task Bihaan would take twice as long as Armaan and Rehmaan together; and Rehmaan would take 3 times as long as Armaan and Bihaan together. Three of them together can complete the task in 14 hours. How much time (in hours) is taken by Bihaan and Rehmaan to complete the task?

Q 7. A racing track is of length 60 m. Abhi and Bala enter a 360 m race starting simultaneously at one end of the track at speeds 4 m/s and 6 m/s respectively. How many times will they meet while running in opposite directions before Bala finishes the race?

Q 8. In a local train from station A to station B, the passengers traveling in Tiers I, II and III are in the ratio 3 : 7 : 8 and the rates for each class are in the ratio 5 : 4 : 2. If the total monthly income from this train is Rs. 54,280, then find the annual income (in Rs.) of this train from Tier II.

Q 9. Rajesh, a fruit seller, had 2 boxes each containing 60 Alphonso mangoes. From the first box he sold 48 mangoes at a profit of 30% and 12 mangoes at a profit of 25%. He sold all the mangoes in the second box at a profit of 24% and his profit was reduced by Rs.450 when compared to the first box. What is the cost price (in Rs.) of a dozen mangoes?

1) 1,500

2) 1,800

3) 1,750

4) 2,400

Q 10. Two trains A and B are moving in opposite directions with speeds in the ratio 5 : 7. Train A crosses a pole in 20 seconds and Train B crosses the same pole in 8 seconds. What is the time (in seconds) in which they can completely cross each other?

Q 11. ABCDEF is a regular hexagon inscribed inside a circle. If the shortest diagonal of the hexagon is of length √3 cm, then find the area (in sq. cm) of the circle outside the hexagon.

1) $\pi-\frac{2}{\sqrt{3}}$

2) $\pi-\frac{3\sqrt{3}}{2}$

3) $\pi-\frac{\sqrt{3}}{2}$

4) $2\pi-\frac{2}{\sqrt{3}}$

Q 12. In preparing a meal for 12 people, a chef uses 2 kg of potatoes, 3 cauliflowers weighing 1/2 kg each, 1320 grams of bread and 1 kg of cheese. One-fourth of the weight of the material is lost in preparation and cooking. If 2 people leave the meal and the rest consume all the meal, then how much more average weight of the meal in grams (to the nearest integer) each of the remaining persons consumes?

1) 73

2) 82

3) 63

4) 71

Q 13. The arithmetic mean of 1/a and 1/b is A and the geometric mean of a and b is G. If G : 1/A = 5 : 4, then the ratio of b : a can be

1) 1 : 2

2) 1 : 3

3) 4 : 3

4) 4 : 1

Q 14. Three workers A, B and C are appointed to do a job. They started the job together but C leaves after 4 days when 44% of the job is done. The remaining job is completed by A and B in 8 days. Find the number of days required by C to complete the entire job alone?

Q 15. At Gokul Dairy farm the manager mixes milk and water in the ratio 4 : 7 in a can. However after mixing, he feels that the customers might not approve of such high levels of dilution so he removes 12 liters of the mixture and adds equivalent quantity of pure milk. Finally the ratio of milk and water when tested is 7 : 4. How many liters of mixture was there initially in the can?

1) 28

2) 30

3) 45

4) 35

Q 16. Let $ax^2 + bx + c = 0$ be a quadratic equation, where a, b and c are rational numbers and $a \neq 0$. If one of the roots of the equation is $(1 + \sqrt{2})$, then bc/a^2 is

1) 1/2

2) 1

3) 2

4) 4

Q 17. Let $10 < N < 1000$ be a natural number. P denotes the product of the digits of N. S denotes the sum of the digits of N. If $3P + 2S = 2N$, then how many values can N take?

1) 9

2) 10

3) 11

4) More than 11

Q 18. Harsh bought a flat that cost him Rs.25 lakh, which depreciated at 20% in the first year, 15% in the second year and 10% in the third year. He also bought a plot of land that cost him Rs.30 lakh that appreciated at the rate of 12% in the first year, 14% in the second year and 16% in the third year. What was the change in total value of the flat and plot of land at the end of three years?

1) Decrease of Rs. 44,543

2) Increase of Rs. 4,73,264

3) Increase of Rs. 5,73,212

4) Decrease of Rs. 3,72,654

Q 19. The sides of a parallelogram are $7x - 2$ and $5x + 6$. It has a perimeter of 56 cm and an area of 96 sq. cm. The value of the obtuse angle (in degrees) between its sides is

1) 150

2) 120

3) 100

4) 135

Q 20.

Let $a_n = \frac{a_{n-2} \times a_{n-1}}{2a_{n-2} - a_{n-1}}$ for $n \geq 3$ and $a_1 = 1, a_2 = \frac{3}{7}$. If $\frac{a_{14}a_{16}a_{19}}{a_4a_7a_9} = \frac{p}{q}$ such that p and q are natural numbers coprime to each other, then what is the value of p + q?

Q 21. Siddhi deposited Rs. 1,20,000 in a bank which paid 10% compound interest for 2 years. Then after 2 years, she started a business with the amount received along with Riddhi, who joined with a capital of Rs.1.32 lakh. Siddhi invested for 6 months and left whereas Riddhi invested for the whole year. What will be the ratio of their profits at the end of the year?

1) 11 : 20

2) 12 : 17

3) 121 : 130

4) 13 : 19

Q 22. The number of integral values of x satisfying the inequality $|6x - 9| < 15 - 4x$ is: