Prime CAT 02 2022 QA

Q 1. Let p and q be the roots of the equation $x^2 + 7x - 11 = 0$. If roots of the equation $3x^2 + bx + c = 0$ are $p - 2$ and $q - 2$, then the value of $b - c$ is

---

Q 2. Two trains A and B running in opposite directions cross each other in 18 seconds and cross a tower in 21 seconds and 16 seconds respectively. The ratio of speed of train A to that of train B is

1) 3 : 2

2) 3 : 4

3) 4 : 3

4) 2 : 3

Q 3. Rashi's house rent is 50% more than that of Ayushi and 75% more than that of Jyoti. Rashi's house rent is what percent of the total house rent of Ayushi and Jyoti together?

1) 77.01%

2) 80.77%

3) 67.17%

4) 90.33%

Q 4. Let N and M be number of integral solutions to $||x| - 2022| < 10$ and $|2030 - |y|| < 12$. What is the value of $|M - N|$?

Q 5. ABC is a triangle whose $\angle A = 120°$. The angle bisector AD of $\angle A$ meets BC at D. If AB = 2AC and AD = 20 cm, then the value of BC (in cm) is

1) 30

2) $20\sqrt{7}$

3) 60

4) $30\sqrt{7}$

Q 6. All page numbers of a book are added up, starting with page 1. However, two consecutive page numbers were mistakenly added twice. The sum obtained was 1250. The page numbers added twice were _____.

1) 11, 12

2) 13, 14

3) 12, 13

4) 10, 11

Q 7. It takes 11 workers a total of 5 hours to complete a project, with each working at the same rate. If five workers start at 8.00 AM, and one worker per hour joins them from 1:00 PM, then at what time will the project get over?

1) 5:00 PM

2) 5:30 PM

3) 6:00 PM

4) 7: 00 PM

Q 8.

If $T_n = 5T_{n-1} - 6T_{n-2}$ for $n \geq 2$ such that $T_0 = 2$, and $T_1 = 5$, then find the last digit of T_{2003}.

Q 9. ABCD is a quadrilateral such that AB = 3 cm, BC = 15 cm, CD = 4 cm and AD = 20 cm. If $\angle ABC + \angle BCD = 270°$, then what is the area (in sq. cm) of quadrilateral ABCD?

Q 10.

Let R be the range of the function $f(x) = \frac{x^2 - 4x + 9}{3x^2 - 12x + 28}$. Then, what is the value of R for all real values of x?

1) $1/4 \leq R < 1/2$

2) $5/16 \leq R < 1/3$

3) $5/8 \leq R < 1/2$

4) $5/16 \leq R \leq 1/3$

Q 11. In a business, Anil invests two-third of the capital for 8 months, Sunil invests one-sixth of the capital for one-third of the total time and Kamal invests the rest of the capital for the whole time, that is 12 months. Find the difference between the profit (in Rs.) of Sunil and Kamal if Anil's share is Rs.9,276.

Q 12. In an examination, Shiv wrote 6 papers having equal maximum possible marks. The marks he secured in these papers are in the ratio 4 : 6 : 7 : 8 : 11 : 12. The average of his highest and lowest scores is 48%. Find the number of papers in which he scored not less than 60%.

1) 0

2) 1

3) 2

4) 3

Q 13. Three equal circles are placed inside an equilateral triangle such that any circle is tangential to two sides of the equilateral triangle and to two other circles. If the total area of the three circles is 3π sq. cm, then what is the area of the equilateral triangle outside the three circles?

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

2) $2\sqrt{3}(2 + \sqrt{3}) - 3\pi$

3) $2(4 + \sqrt{3}) - 3\pi$

4) $\sqrt{3}(4 + 3\sqrt{3}) - 3\pi$

Q 14. Four friends A, B, C and D live in a shared accommodation. At the end of a particular month A paid 40% of the rent. Of the remaining rent, B paid 50%. Of the remaining rent, C paid 70%. D paid the remaining Rs. 918. What is the average monthly rent (in Rs.) paid by the four friends?

1) 2,250

2) 2,450

3) 2,550

4) 3,250

Q 15. If $\log_2 x + \log_2 y \geq 6$, then what is the least value of $x + y$?

Q 16. Sanjeev brought two mobile phones having different prices for a total cost of Rs. 60,000. By selling one for 3/4 of its cost price and another for a profit of 25%, he earned a profit of Rs. 5,000 on the whole transaction. Find his % profit if he had sold the phone with the lower price at no profit and no loss.

1) 15%

2) 16.67%

3) 11.11%

4) 20%

Q 17. For how many integer values of c, the equation $|x^2 - 6x - c| = 10$ has exactly two different real roots?

1) 2

2) 18

3) 19

4) 20

Q 18. Let 'abc' and 'pqr' be two 3-digit positive integers such that all six digits are distinct. The sum of these two numbers is a 3-digit number S. What is the smallest possible value for the sum of the digits of S?

1) 3

2) 4

3) 5

4) 7

Q 19. Find the number of common terms between the two sequences S1 = {21, 25, 29, ..., 421} and S2 = {16, 21, 26, ..., 471}.

Q 20. A vessel contains a mixture of liquid A and liquid B in the ratio 11 : 14 respectively. Some of the mixture is withdrawn and some amount of liquid C is added and then the ratio of liquids A, B and C becomes 22 : 28 : 19 respectively. After adding liquid C, the total amount of mixture in the vessel is 15 liters less than the initial amount of mixture. If the amount of liquid A taken out from vessel is 153 liters less than the amount of liquid C added to the vessel, then find the amount of liquid B (in liters) initially in the vessel.

1) 420

2) 528

3) 680

4) 588

Q 21. Let S be the set of all fractions p/q such that p and q are relatively prime positive integers. How many fractions in S are such that if both p and q are increased by 1, the value of the fraction increases by 10%?

Q 22. The capacity of four taps B, C, D and E is 2, 3, 4 and 5 times of tap A respectively. If A, C, and E act as input pipes and B and D act as output pipes, time required to fill the tank is 'm'. If C, D, E act as input pipes and A and B act as output pipes, then time required to fill the tank is 'n'. If A and B working together as input pipes can fill the tank in 4 hours, then what is the value of |m – n|?

1) 4 hours 40 minutes

2) 3 hours 20 minutes

3) 2 hours 40 minutes

4) 4 hours 20 minutes