## Section 2: Analytical and Quantitative Ability

**Q.33**   The number of zeros at the end of 99! (factorial 99) is

(1 mark)

[A]   2
[B]   12
[C]   22
[D]   32

**Q.34**   $1+ 2^2 + 2^4 + 2^6 + \ldots + 2^{48} =$

(1 mark)

[A]   $2^{49}-1$
[B]   $(2^{49}-1)/3$
[C]   $2^{50}-1$
[D]   $(2^{50}-1)/3$

**Q.35**   $\left(1 - \frac{1}{2}\right)\left(1 - \frac{1}{3}\right)\left(1 - \frac{1}{4}\right)\ldots\left(1 - \frac{1}{1000}\right) =$

(1 mark)

[A]   0.0001
[B]   0.001
[C]   0.01
[D]   0.1

**Q.36**   If the difference between two specific numbers is 12, the LCM of the two numbers is 63 and the HCF of the two numbers is 3, then the sum of the two numbers is

(1 mark)

[A]   30
[B]   25
[C]   15
[D]   45

**Q.37**   Five different alarm clocks ring their alarms at every 15 minutes, 30 minutes, 45 minutes, 1 hour, and 75 minutes, respectively. If all the alarms are rung together now, then how many more times all the clocks ring together again in the next 48 hours?

(1 mark)

[A]   2
[B]   3
[C]   4
[D]   5

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**Q.38**     The HCF of $(2^{99} - 1)$ and $(2^{12} - 1)$ is

(1 mark)

      [A]    4095
      [B]    127
      [C]    15
      [D]    7

**Q.39**     The LCM of $(x^2 - 4)$ and $(x^2 + x - 6)$ is

(1 mark)

      [A]    $x^3 + 3x^2 - 4x - 12$

      [B]    $x^4 + x^3 - 10x^2 - 4x + 24$

      [C]    $2x^2 + x - 10$

      [D]    $x - 2$

**Q.40**     In 2019, the average age of Eric, Phillip, and Naveen is 30 years. In 2024, the average age of Eric and Phillip will be 33 years. The age of Naveen in 2019 is

(1 mark)

      [A]    24 years
      [B]    29 years
      [C]    34 years
      [D]    39 years

**Q.41**     Let $a_1, a_2, \ldots, a_5$ and $b_1, b_2, \ldots, b_5$ are two sets of consecutive positive numbers. The average of $a_1, a_2, \ldots, a_5$ is 2 less than the average of $b_1, b_2, \ldots, b_5$. How many numbers are common between the sets $a_1, a_2, \ldots, a_5$ and $b_1, b_2, \ldots, b_5$?

(1 mark)

      [A]    0
      [B]    1
      [C]    2
      [D]    3

**Q.42**     If $p : q = 2 : 3$ and $q : r = 9 : 8$, then $\dfrac{p}{\sqrt{p^2 + r^2}} =$

(1 mark)

      [A]    $\dfrac{3}{5}$

      [B]    $\dfrac{1}{3}$

      [C]    $\dfrac{2}{5}$

      [D]    $\dfrac{2}{3}$

**Q.43**  The number of boys in a class is 25 more than the number of girls and the ratio of boys to girls is 3:2. The total number of students in the class is

(1 mark)

[A]  75
[B]  100
[C]  125
[D]  150

**Q.44**  The sides of a right-angled triangle are in the ratio 3:4:5 and the area of the triangle is 96 cm$^2$. The length of the largest side of the triangle is

(1 mark)

[A]  16 cm
[B]  20 cm
[C]  24 cm
[D]  12 cm

**Q.45**  Alvin sold an item to Brandon at a profit of 20% and Brandon sold the same to Christopher at a profit of 15%. If Brandon obtained a profit of Rupees 72, then the profit obtained by Alvin is

(1 mark)

[A]  Rupees 96
[B]  Rupees 88
[C]  Rupees 80
[D]  Rupees 72

**Q.46**  By using a false weight, an unfair shopkeeper sells all his goods at cost price and still obtains 25% profit. The actual weight of the 1 kg used by the shopkeeper is

(1 mark)

[A]  750 g
[B]  800 g
[C]  850 g
[D]  900 g

**Q.47**  Assume that the length of a rectangle is increased by 25% and the width is decreased by $x\%$ such that there is no change in the area of the rectangle. The value of $x$ is

(1 mark)

[A]  4
[B]  25
[C]  12.5
[D]  20

**Q.48**     Consider three persons Amar, Akbar, and Anthony. Amar can complete a task in 40 days and Akbar in 60 days. If all three work together, they can complete the task in 16 days. If Anthony works alone, then he will be able to complete the task in

(1 mark)

[A]     50 days
[B]     48 days
[C]     46 days
[D]     44 days

**Q.49**     A team of N persons can complete a task in 24 days. After 6 days of working together by the team of N persons, another 6 persons join them and these N+6 persons complete the remaining part of the task in the next 12 days. If all are equally capable then the value of N is

(1 mark)

[A]     6
[B]     12
[C]     18
[D]     24

**Q.50**     Six years ago, the age of Ally was 4 times that of Bally, and the age of Cally was 2 times that of Bally. If the present age of Ally is 1.5 times the present age of Cally, then the present age of Bally is

(1 mark)

[A]     3 years
[B]     12 years
[C]     6 years
[D]     9 years

**Q.51**     The age proportion of a trio of grandfather, father, and son at present is 5:3:1 and the age gap between the father and son is 20 years. The age proportion of the trio will become 3:2:1 after

(1 mark)

[A]     5 years
[B]     10 years
[C]     15 years
[D]     20 years

**Q.52**     The rate of interest in a saving account is 10% per annum, compounded annually. The total amount of interest earned, by this compound interest scheme, after 2 years is

(1 mark)

[A]     0.11 times of the principal amount.
[B]     0.21 times of the principal amount.
[C]     0.31 times of the principal amount.
[D]     0.41 times of the principal amount.

**Q.53** A particular sect has a population of 32,768. Each year, the population is reduced by 75%. The population at the end of 7 years will be

(1 mark)

[A]  2
[B]  16
[C]  32
[D]  64

**Q.54** Consider 100 positive integers, $x_1, x_2, ..., x_{100}$, such that $x_1 - x_2 = 1$, $x_2 - x_3 = 2$, $x_3 - x_4 = 3$, ... $x_{99} - x_{100} = 99$. If $x_{100} = 100$, then the value of $x_1$ is

(1 mark)

[A]  1
[B]  1050
[C]  4050
[D]  5050

**Q.55** $\sin(30°) + \cos(60°) =$

(1 mark)

[A]  $\sqrt{3}$

[B]  1

[C]  $\sqrt{2}$

[D]  $2\sqrt{3}$

**Q.56** In certain coding pattern, if APPLE is NCCBR, then ORANGE is

(1 mark)

[A]  DENAVR
[B]  BENATR
[C]  DENATR
[D]  BENAVR

**Q.57** **Fill in the blank with the correct option that represents the correct pattern in the sequence given below.**

ECG; JHL; OMQ; _____

(1 mark)

[A]  SQU
[B]  XVZ
[C]  TRV
[D]  DBF

**Q.58**    The total number of squares in an 8x8 chess board is

(1 mark)

[A]    64
[B]    144
[C]    184
[D]    204

**Q.59**    Consider a sequence of numbers i.e. 3, 8, 24, 48, 120, 168, 288,--------.
The number that comes immediately after 288 is

(1 mark)

[A]    456
[B]    336
[C]    360
[D]    408

**Q.60**    Consider a 5-digit number $abcde$, such that $b$ is twice that of $d$; $a$ is equal to the sum of $c$ and $e$; $e$ is equal to the difference of $b$ and $a$; and $d$ is twice that of $c$. The number that represents $abcde$ is

(1 mark)

[A]    34221
[B]    24122
[C]    58243
[D]    68244

**Q.61**    **This question carries 2 marks. One option or more options is/are correct answer(s) to this question.**
The calendar for the year 2019 will be the same for the year(s)

(2 marks)

[A]    2024
[B]    2030
[C]    2036
[D]    2041

**Q.62**    **This question carries 2 marks. One option or more options is/are correct answer(s) to this question.**

Alex purchased 2 kg tomatoes and 5 kg potatoes for Rupees 100 and Bob purchased 3 kg potatoes and 4 kg onions for Rupees 80. The option(s) suited for the above conditions for the cost of 1 kg tomatoes and 1 kg onions, is/are

(2 marks)

[A]    Rupees 20 and Rupees 11, respectively.
[B]    Rupees 10 and Rupees 8, respectively.
[C]    Rupees 12 and Rupees 10, respectively.
[D]    Rupees 25 and Rupees 12.50, respectively.

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**Q.63**    **This question carries 2 marks. One option or more options is/are correct answer(s) to this question.**

$$\sec^2(\theta) - \tan^2(\theta) =$$

(2 marks)

[A]    1

[B]    $cosec^2(\theta) - \cot^2(\theta)$

[C]    $\frac{1 - \sin(\theta)}{\cos(\theta)}$

[D]    0

**Q.64**    **This question carries 2 marks. One option or more options is/are correct answer(s) to this question.**

The marks obtained by Arun and Barun in five subjects (out of 100 per subject) are given here. The marks obtained by Arun in Subjects 1, 2, 3, 4 and 5 are 80, 70, 60, 90 and 80, respectively. The marks obtained by Barun in Subjects 1, 2, 3, 4 and 5 are 70, 90, 70, 60 and 100, respectively.

The correct statement(s) among the following is/are

(2 marks)

[A]    The ratio of the highest marks to the lowest marks obtained by Arun is 3:2.

[B]    In Subject 4, Barun obtained 30% less than Arun.

[C]    Excluding the highest scored subject and the lowest scored subject for each student, the average marks obtained by both the students is the same.

[D]    If $n_x$ is the number of subjects in which student $x$ scored more than his own average marks, then $n_{Barun} > n_{Arun}$.

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Courtesy : IIT MADRAS