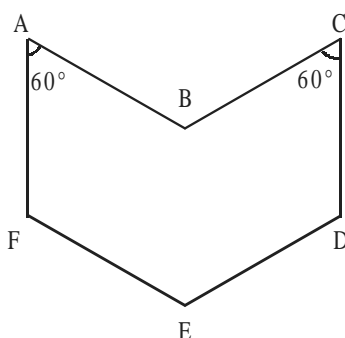


## SECTION I

**Number of Questions: 50**

1. There was a fundraising effort for a party being organized by Babloo. 60 % of the participants contributed 80 % of the funds. The average contribution of all the people who attended is Rs 50. What is the average contribution of the remaining 40 % of the people?  
 1. Rs. 100                      2. Rs. 150                      3. Rs. 250                      4. Rs. 25
2. What is the solution set of the inequality  $x^3 - x^2 + x - 1 > 0$ ?  
 1.  $x < -1$                       2.  $-1 < x < 1$                       3.  $x > 1$                       4.  $x > 0$
3. A and B start simultaneously at one end of a swimming pool whose length is 50 m. The swimming race is a race of 1000 m. If A beats B and meets him 17 times during the course. If A's speed is 5 m/s then the speed of B could be  
 1. 1 m/s                      2. 3 m/s                      3. 4 m/s                      4. 6 m/s
4. There are 3 cities A, B, C. A and B are connected by 3 direct roads. B and C are connected by X direct roads and, A and C by Y direct roads. There are 20 ways of going from A to C without passing through the same routes twice. How many routes are there from B to C if there were minimum number of roads in the scenario mentioned ?  
 1. 12                      2. 20                      3. 28                      4. 36
5. The value of  $\left(\frac{1}{1+x^{-2}+x^{-3}}\right) + \left(\frac{1}{1+x^{-1}+x^2}\right) + \left(\frac{1}{1+x+x^3}\right)$  for any non zero value of x is  
 1. 2                      2. 1                      3.  $x^{-1} + x^{-2} + x^{-3}$                       4.  $x + x^2 + x^3$
6. In the adjoining plane figure, sides AF and CD are parallel, as are sides AB and FE and sides BC and ED. Each side has length 1 unit. Also  $\angle FAB = \angle BCD = 60^\circ$ . The area of the figure is



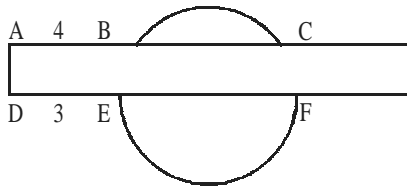
1.  $\sqrt{\frac{3}{2}}$  sq. units                      2. 1 sq. units                      3.  $\frac{3}{2}$  sq. units                      4.  $\sqrt{3}$  sq. units

7. A confused bank teller interchanged the rupees and paise when he cashed a cheque for Sami, giving him rupees instead of paises and paise instead of rupees. After buying a newspaper for 50 paise, Sami noticed that he was left with exactly three times as much as the original cheque. What was the amount of the cheque?
1. Rs. 97. 97                      2. Rs. 18.56                      3. Rs. 17: 51                      4. Rs. 10.35
8. If  $3^{2x+1} - 3^x = 3^{x+3} - 3^2$ , then how many values of x are possible (where x is a integer)?
1. 3                      2. 1                      3. 4                      4. None of these

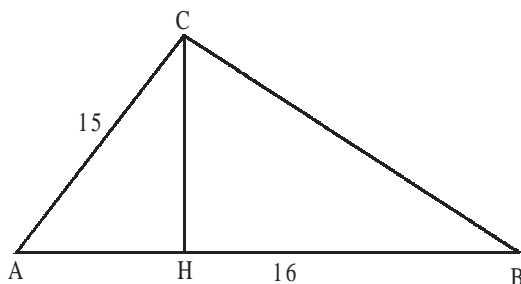
**DIRECTIONS for Questions 9 and 10:** x, y, z are all natural numbers and  $x < y < z$ . Sum of the square roots of these numbers is 1325 and  $x^{1/4}, y^{1/4}, z^{1/4}$  are consecutive integers.

9. What is the value of  $y^{1/4}$  ?
1. 20                      2. 21                      3. 22                      4. 23
10. What is the value of z ?
1. 16000                      2. 194481                      3. 234256                      4. 279842.
11. A boat starts from point A and goes to point C which is 200 m away. B is 80 m away from A on the way to C. All these three points are on the same bank of the river which flows at 2 m/s. The boat man moves in the direction of the river on the way from A to C and on the way back paddles against the river along the same route. The speed of the boat in still water on the way from A to B (or from B to A) is half of the same from B to C (or from C to B ). The boat takes 2 min 21 s to start from A and return to its original position. If the boatman started back immediately on arrival at C, the speed of the boat in still water from A to B could be
1. 2 m/s                      2. 2.5 m/s                      3. 3 m/s                      4. 4 m/s
12. Find the sum of the digits of the minimum number which when divided by 9 leaves a remainder of 8, when divided by 8 leaves a remainder of 7, and so on till 2?
1. 16                      2. 17                      3. 26                      4. None of these
13. What is the sum of all the 5 digit numbers formed using 1, 2, 3, 4, 5 such that there is no repetition of digits. The sum of all such numbers as represented in base 6 is
1. 1666650                      2. 155554000                      3. 61332720                      4. 6666600
14. A covers approximately 42.84% less than the distance covered by B in the same time. A and B are participating in a race. A and B start simultaneously and B beats A by 48 m. The length of the race is
1. 84 m                      2. 96 m                      3. 112m                      4. 192 m
15. If  $a_1, a_2, a_3, a_4, \dots, a_{24}$  are in arithmetic progression and  $a_1 + a_5 + a_{10} + a_{15} + a_{20} + a_{24} = 225$ , then the sum of the series  $a_1 + a_2 + a_3 + a_4 + \dots + a_{24}$  is
1. 909                      2. 75                      3. 750                      4. 900

16. A rectangle intersects a circle as shown.  $AB = 4$  cm,  $BC = 5$  cm and  $DE = 3$  cm. Then  $EF$  equals



1. 6 cm                      2. 7 cm                      3.  $\frac{20}{3}$  cm                      4. 8 cm
17. If three consecutive numbers are selected randomly from the first 100 natural numbers, then what is the probability that their product of the three numbers is divisible by 24?
1.  $\frac{19}{50}$                       2.  $\frac{25}{98}$                       3.  $\frac{19}{49}$                       4. None of these
18. A and B are solving the quadratic equation  $ax^2 + bx + c = 0$ . A makes a mistake while noting down the value of  $c$  and B makes a mistake while noting down the value of  $b$ . The roots calculated by A, B are  $(3, 2)$  and  $(-6, 1)$  respectively. The correct roots are
1. 3, -2                      2. 2, -3                      3. 6, -1                      4. -6, -1
19. How many numbers can be picked from the first 9000 natural numbers so that they are either divisible by 9 or perfect squares?
1. 1000                      2. 1094                      3. 1063                      4. 1031
20. If a manufacturer plans to reduce the manufacturing cost by 10% and increase his selling price by 20%, to make one and half times the profit as before provided he sells as many pieces as before. However the manufacturing cost goes up by 20% of the original manufacturing cost and the selling price holds steady at the increased rate. If the number of units sold after the increase is  $\frac{2}{3}$  rds the number before the increase then the ratio of the profits before the increase and after the increase is
1. 3 : 1                      2. 15 : 6                      3. 15 : 8                      4. None of these
21. A right angled triangle ABC with hypotenuse AB has side  $AC = 15$  units. Altitude CH divides AB into segments AH and HB with  $HB = 16$  units. The area of  $\triangle ABC$  is



1. 120 units                      2. 144 units                      3. 150 units                      4. Cannot be determined

22. If the prices rose by 25% every odd year and fell by 20% every even year, what would be the percentage change after 10 years?

1. 10% increase      2. 25% increase      3. No change      4. 20 % decrease

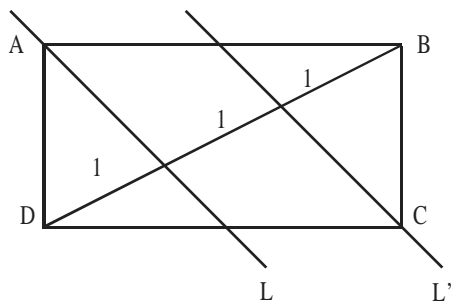
23. Five men crash-land their airplane on a deserted island in the South Pacific. On their first day they gather as many coconuts as they can find into one big pile. They decide that, since it is getting dark, they will wait until the next day to divide the coconuts.

That night each man took a turn watching for rescue searchers while the others slept. The first watcher got bored so he decided to divide the coconuts into five equal piles. When he did this, he found he had one remaining coconut. He gave this coconut to a monkey, took one of the piles, and hid it for himself. Then he jumbled up the four other piles into one big pile again. Each of the five men ended up doing exactly the same thing. They each divided the coconuts into five equal piles and had one extra coconut left over, which they gave to the monkey. They each took one of the five piles and hid those coconuts. They each came back and jumbled up the remaining four piles into one big pile.

What is the smallest number of coconuts there could have been in the original pile?

1. 3121      2. 3125      3. 1025      4. None of these

24. Diagonal BD of rectangle ABCD is divided into 3 segments of length 1 unit by parallel lines L and L' that pass through A and C and are perpendicular to DB. The area of ABCD, rounded to one decimal place is



1. 4.1 sq. units      2. 4.2 sq. units      3. 4.3 sq. units      4. 4.4 sq. units

25. What is the sum of the first 10 natural numbers with odd number of factors ?

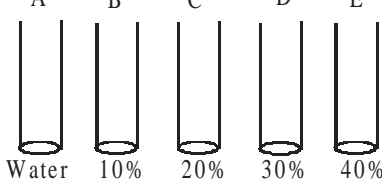
1. 220      2. 385      3. 129      4. 3025

26. In an LCD display some numbers when viewed upside down, are images of other numbers. (e.g., 1995 becomes 5661). The 5th number that can read upside down is 8, and the 15th is 21, which is 12 when viewed upside down. What is the millionth number that is meaningful upside down?

1. 55,666,515      2. 11,555,511      3. 11,662,331      4. 201,155,666

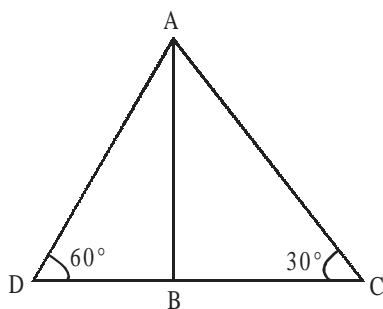
27. If N is divided by 7 the remainder is 3 and when divided by 11 the remainder is 8. Then the number of 3 digit numbers that have the same property as N is

1. 12      2. 13      3. 14      4. 15

28. A milk man diluted milk to an extent of 25 % of the original volume of pure milk with water and priced it same as the cost price of milk. Part of the water evaporated and the volume was reduced to  $\frac{23}{25}$ th of the diluted volume. The profit % to the milk man is
1. 23 %
  2. 25 %
  3. 15 %
  4. None of these
29. The average marks of 17 students in a class is A. The marks of the students when arranged in either the ascending or the descending order was found to be in an arithmetic progression. The class teacher found that the students who were ranked 3<sup>rd</sup>, 7<sup>th</sup>, 9<sup>th</sup>, 11<sup>th</sup>, 15<sup>th</sup> had copied in the exam and hence got all of them rusticated. The average of the remainder of the class was B. Then
1. A = B
  2. A > B
  3. A < B
  4. Data Insufficient.
30. There are two right pyramids with a square base. The two pyramids are similar in shape. The height of the first pyramid is 30 m and that of the smaller is 22.5 m. 36 men take 32 days to build the first pyramid. How many days would 54 men of the same efficiency take to build the second pyramid ?
1. 36
  2. 16
  3. 9
  4. None of these
31. In every cyclic quadrilateral ABCD with AB parallel to CD,
1. AD = BD, AC ≠ BD
  2. AD ≠ BC, AC ≠ BD
  3. AD ≠ BC, AC = BD
  4. AD = BC, AC = BD
- 32.
- |   |     |     |     |     |
|---|-----|-----|-----|-----|
| A   | B   | C   | D   | E   |
|  | 10% | 20% | 30% | 40% |
| Water   | HCl | HCl | HCl | HCl |
- In a chemical plant there are five pipelines A, B, C, D & E carrying pure water, 10% HCl, 20% HCl, 30% HCl and 40% HCl respectively. A, B, C, D and E individually can fill a cistern in 20, 30, 60, 90 and 120 hrs respectively. On Monday morning at 10 a.m. pipe A is opened. Thereafter at the end of every hour the other pipes are opened in the order B, C, D, and E. The concentration of HCl in the cistern at 6 p.m. on the same day is
1. 7%
  2. 8.92%
  3. 9.8%
  4. 10.78%
33. The tenth's place of the number  $39^{78}$  is
1. 0
  2. 1
  3. 6
  4. 8
34. In a family there is a grandfather, a grandmother, two fathers, two mothers, four children, three grandchildren, one brother, two sisters, two sons, two daughters, one father in law, one mother in law and one daughter in law. What is the minimum number in family members?
1. 23
  2. 22
  3. 7
  4. 13
35. There is a cylinder of height x cm and radius y cm. The cylinder is half full. What is the ratio x : y is it takes 5 cylinders of the height y cm and radius x cm to fill the remaining part of the first cylinder?
1. 1 : 5
  2. 5 : 1
  3. 2 : 20
  4. 5 : 2

36. The number of common roots of  $x^2 + 3x - 4 = 0$  and  $x^3 - 4x = 0$  is  
 1. 0                                      2. 1                                      3. 2                                      4. 3
37. A function is defined as  $f^n(x) = f\{f^{n-k}(x)\}$   
 If  $n$  is odd,  $k = 1$ .  
 If  $n$  is even,  $k = 2$  and  $f^0(x) = 1$ .  
 Find  $f^7(x)$  at  $x = 1$ , if  $f(x) = x^2 + 1$ .  
 1. 676                                      2. 677                                      3. 577                                      4. 1076
38. In the series 1, 8, 15, 22, 29, ..., 701 if a number is chosen at random then the probability of the number being a perfect square is  
 1.  $\frac{4}{25}$                                       2.  $\frac{8}{101}$                                       3.  $\frac{16}{101}$                                       4.  $\frac{7}{101}$
39. The rope of length 'L' meters, can exactly be cut into pieces of 3 meters and 7 meters, had it been 1 meter shorter it could have exactly formed prime number of squares having integer sides. Minimum possible value of 'L' is :  
 1. 41                                      2. 83                                      3. 21                                      4. 146
40. The difference between the square of the two digit number 'ab' and the square of the number formed by reversing it is 792. Then  $(a + b)(a - b)$  is  
 1. 2                                      2. 4                                      3. 6                                      4. 8
41. A says I am a perfect number. B says I am a set of all factors of A. C says I am a set of all quotients which are obtained by dividing all the numbers of set B individually with A. D says I am a number obtained by summing up all the reciprocals of elements of set C. What is D?  
 1. 2                                      2. Depends on A                                      3. A                                      4. Cannot be determined
42. A, B, C, D, E are five consecutive integers and the average of these five numbers is less than  $\frac{1}{4}$  of A. Then which of the following option is correct?  
 1. A is positive                                      2. A is negative                                      3. A is even                                      4. Data Inconsistent.
43. An army convoy which is 40 miles long advances 40 miles. When the convoy makes a messenger on a horse back starts from the rear of the convoy, goes to the front and returns to the same position in the rear of the convoy. The distance covered by the messenger is  
 1. 80 miles                                      2. 96.5 miles                                      3. 74.8 miles                                      4. Insufficient data
44.  $(x^2 - 1)$  is a factor of  $f(x) = (x^5 + ax^4 + bx^3 + cx^2 + x + d)$ . The graph of  $f(x)$  intersects the Y axis at  $(0, -3)$ . Find the value of  $(a + c)$ .  
 1. 0                                      2. 3                                      3. -3                                      4. -1
45. A man is running on a circular track with uniform speed and a source of light is placed on the ground at the centre of the circular track. The shadow of a man appears on a wall tangential to the circular track at the point of start. The height of the shadow was found to be twice the height of the man 30 min after the man had started running. It was found that the man was yet to complete one round of the circle. The time taken by the man to complete 10 rounds is  
 1. 6 hrs                                      2. 30 hrs                                      3. Either (1) or (2)                                      4. 60 hr

46.



AB is perpendicular to DC. A person (with constant speed) can travel distance AD in 5 minutes less than the time what he takes to travel AC. How long he will take to travel AB?

1.  $\frac{5\sqrt{3}}{2(\sqrt{3}-1)}$  min
2.  $\frac{5\sqrt{3}}{2(\sqrt{5}-1)}$  min
3.  $\frac{5}{\sqrt{3}}$  min
4. Data insufficient

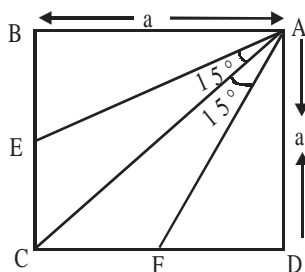
47. If  $N^3 = 1367631$ , then  $N =$

1. 121
2. 111
3. 119
4. 101

48. In a certain base system the conversion of 3588 from decimal is written as 2772. In the same base 7176 of decimal system is written as

1. 5544
2. 5644
3. 5540
4. 5434.

49. ABCD is a square with side a units. Find the area of AECF.



1.  $\frac{a^2}{\sqrt{3}}$  sq. units
2.  $\frac{a^2}{3}$  sq. units
3.  $\left(\frac{\sqrt{3}-1}{\sqrt{3}}\right)a^2$  sq. units
4. None of these

50. When asked for his taxi number, a driver replied:

"If you divide the number of my taxi by 2,3,4,5,6 each time you will find a remainder of one. But if you divide it by 11, you will find no remainder. You will also not find any other driver with a taxi having a lower number who can say the same". What is the taxi number?

1. 121
2. 1001
3. 1881
4. None of these