07.09.2020 FN SESSION- CTS TRAINING

1. A number becomes a perfect square when we subtract 1 from it. Which of the given options **CANNOT** be the last digit of that number ?

a. 2 b. 4 c. 5 d. 0

1, 4 , 9 , 16 , 25 , 36 , 49 , 64 , 81 , 100………… are perfect squares

121 144 169 196 225 256 289 324 361 400

A perfect square cannot end in 2,3,7,8.

The last digit cannot be 2+1(3),3+1(4),7+1(8),8+1(9)

2. If the sum of 4 times a number A and three times a number B is equal to the sum of number B and seven times the number A, then what is the value of A:B?

A : B = A / B

4A + 3B = B +7A

2B = 3A

A / B = 2 / 3

A : B = 2 : 3

3. The number of ways in which 8 different flowers can be strung to form a garland so that 4 particular flowers are never separated are ?

TWO TYPES OF CIRCULAR ARRANGEMENT

1. Normal Ex. 10 ppl are Seated in a circular way(you cannot flip) 🡪 (n-1)!

2. Garland / Necklace (You can flip) (n-1)! / 2

F1 ,F2, F3 , F4 , F5, F6 , F7 , F8

F5 f6 f7 f8 or f6 f5 f7 f78

5! \* 4! – Linear Arrangemnt

We can arrange 4 ppl for a photograph in 4! Ways linearly, then they can arranged in (4-1)! Ways Circularly

If u can arrange ‘n’ things in n! ways linearly(straight line),then you can arrange ‘n’ things circularly in (n-1)! Ways.

We can arrange 4 ppl for a photograph in 4! Ways linearly,then they can arranged in (4-1)! Ways Circularly

F1 ,F2, F3 , F4 , F5, F6 , F7 , F8

(5-1)! \* 4! = 4! \* 4! = 24 \* 24 = 576/2 = 288.

4. The number of 6-digit even numbers that can be made from digits of the number 214635 are:

1,2,3,4,5,6

\_5\_\_\_ ways x \_\_4\_\_ ways x \_\_3\_\_ ways x \_2\_\_\_ ways x \_\_1\_\_ way x \_3\_\_\_ ways = 360 ways or 360 6 digit even numbers.

5. One third of a two digit number exceeds its one fourth by 7. What is the sum of digits of the number ?

1 / 3 \* x – 1 / 4 \* x = 7

(4x – 3x) / 12 = 7

x = 84.

Sum of digits = 8 + 4 = 12.

6. The product of a number and its multiplicative inverse is 1

Number as 5 ,its multiplicative inverse is 1 / 5.

Number as 10,its multiplicative inverse is 1 / 10

7. The difference of two numbers is 14. Their LCM and HCF are 441 and 7 respectively. Find the numbers.

X – Y = 14.

X \* Y = 441 \* 7

Y = (441 \* 7) / X

X - (441 \* 7) / X = 14

X2 – 14X – 3087=0

(X+49) or (X-63)

X= 63; Y = 49

8. If the LCM and HCF of two numbers are 78 and 13 respectively, the product of two numbers can be expressed as:

a. 2x3x13x11 b. 2x3x13x12 c. 2x3x13x13 d. 2x3x13x14

Prod of 2 nos = LCM \* HCF

Prod of 2 nos = 78 \* 13 = 6 \* 13 \* 13 = 2 \* 3 \* 13 \* 13

9. Riya sold her car for Rs. 50,000 less than what she bought it for and lost 8%. At what price should she have sold the car, if she wanted to gain as much as she lost in the first transaction?

SP = CP – 50 000 ; L % = 8%

CP \* (92 / 100) = SP

CP \* (92 / 100) = CP – 50 000

46 CP / 50 = CP – 50 000

46 CP =50 CP – 25 00 000

23 CP = 25 CP – 12 50 000

12 50 000 = 2 CP

6 25 000 = CP ; P% =8%

CP \* 108 /100 = SP

6 25 000 \* 108 /100 = 6 75 000

10. Jaya bought a car worth Rs. 3,50,000 four years ago. if the value of the car depreciates over time at a fixed rate of 10% per annum, then what will be the present worth of the car?

3 50 000 should be reduces by 10 % , 10% , 10% , 10% each year for 4 yrs

A + B + (AB / 100) = -10-10+(100/100) = -20+1=-19 %

A + B + (AB / 100) = -19-10+(190/100) = -29 + 1.9 = -27.1%

A + B + (AB / 100) = -27.1-10+(271/100)= -37.1 + 2.71 = - 34.39%

3 50 000 \* (100 -34.39)/ 100 = 3 50 000 \* (65.61 / 100) = 2 29 635

ALTERNATE METHOD:

3 50 000 \* (90 /100) \* (90 / 100) \* (90 / 100) \* (90 /100) .

3 50 000 \* (9 /10) \* (9 / 10) \* (9 / 10) \* (9 /10)

3 50 000 \* (9 /10)4

= 3 50 000 \* 6561 / 10 000 = 2 29 635

11. What are the largest 4-digit and the smallest 3-digit numbers divisible by 6,15, 21 and 24?

The smallest number or first number divisible by 6,15,21 and 24.

LCM (6,15,21,24) = 840

The smallest number or first number divisible by 6,15,21 and 24 is 840

The second number divisible by 6,15,21 and 24 is = 1st number + LCM = 840 + 840 = 1680

The third number divisible by 6,15,21 and 24 is = 2nd number + LCM = 1680 + 840 =2520.

Largest 4 digit number is 9999.

Smallest 3 digit number = 840

Largest 4 digit number = 840 \* 10 = 8400 + 840 = 9240

12. Which is better : a successive discount of 40% and 30% or a discount of flat 70%?

Dis 10 % , 10 %, 10%, 10% is not the same as Dis of 40% better discount

Dis 10 % , 10 %, 10%, 10% is the same as Dis of 34.39%

Dis of 70 % is better than a successive discount of 30% and 40 %

13. If a = 0.24 & b =1.76, then compute the following expression - a4 + 4a3b + 6a2b2 + 4ab3 + b4

(a+b)2 \* (a+b)2 = (a+b)4 = (0.24+1.76)4 = (2)4 = 16.

(a2+2ab+b2)\*( a2+2ab+b2)= a4 + 4a3b + 6a2b2 + 4ab3 + b4

PARROT = 6! / 2!

ABC 3! = 6 AAC 3! / 2! = 6 / 2 = 3

ACB ACA

BAC AAC

BCA ACA

CAB CAA

CBA CAA

14. A water filter takes 40 minutes to filter 20 litres of water. Another filter of same specifications takes 30 minutes to filter the same amount of water. If both the filters are used at the same time, then how long will it take them to filter 70 litres of water?

Work done = Efficiency \* Time

Efficiency of Filter A =20 litres / 40 mins = 1 / 2 litre per min

Efficiency of Filter B = 20 litres / 30 mins = 2 / 3 litre per min

Efficiency of (Filter A+ Filter B) in a minute = 1 / 2 + 2 / 3 = 7 / 6 litres per min

Time taken By (Filter A+ Filter B) = 70 litres / (7 / 6) = 60 mins.

15. In a class of 80 students, 4/5 of them own cars. If 15/16 of them own Alto then how many own Alto?

Total 80 students.

Students who own cars are 4 / 5th of 80.

64 students own a car.

No of students who own an Alto = 64 \* (15 / 16) = 60 Students.

16. The number 456\*85 is completely divisible by 3. Smallest whole digit number in place of \* can be:

**Div rule for 3** : Add all digits and their sum must be a multiple of 3.

456\*85 = 4 + 5 + 6 + \* + 8 + 5 = \* + 28 🡪 \* is a digit.

\* + 28 = 2 + 28 = 30

\* + 28 = 5 +28 = 33

\* + 28 = 8 + 28 = 36

2 , 5, 8

17. What is the value of (5-2 x (10)-4) / (2-5 x 5-6)

am \* an = am+n.

am / an = am-n.

a-m = 1/ am.

(5-2 \* 5-4 \* 2-4 ) / (2-5 x 5-6)

5-2 \* 5-4 \* 2-4 \* 25 \* 56 = 5-6 \* 56 \* 21 = 2.

18. The reciprocal of the HCF and LCM of two numbers are 1/12 and 1/312 respectively. If one of the numbers is 24, find the other number?

Reciprocal of HCF is 1 / 12🡪HCF is 12.

Reciprocal of LCM is 1 / 312 🡪 LCM is 312

Prod of 2 nos = HCF \* LCM

24 \* x = 12 \* 312

x = (12 \* 312) / 24 = 156.

19. In a poultry farm, 50 hens give 200 eggs in 2 days. In how many days will 20 hens give 400 eggs?

(M1 D1 H1) / W1 = (M2 D2 H2) / W2

M 🡪No of Persons or things doing the work also called efficiency

D 🡪 Days ; H 🡪 Hours

W 🡪 Amount of work that is done

(50 \* 2) / 200 = (20 \* x) / 400

x = 10 days

20. The number of 5-digit odd numbers that can be made from number 12345 are:

1,2,3,4,5

\_4\_\_\_ ways x \_\_3\_\_ ways x \_2 ways\_\_\_ x \_1 ways\_\_\_\_ x \_\_3 ways\_\_\_ = 72 5 digit odd numbers.

21. How many 4 digit numbers can be made using 1, 2, 3, 4, 5, 6 and 7 with none of the digits being repeated?

1,2,3,4,5,6,7

\_\_7\_\_ ways x \_\_6\_\_\_ ways x \_\_5 \_\_\_ ways x \_\_4\_\_\_ ways = 42 \* 20 = 840 4 digit numbers can be formed.

22. A total profit of Rs. 36,000 is to be distributed among Rajesh, Salesh and Rajeev such that Rajesh : Salesh :: 5 : 4 and Salesh : Rajeev :: 8 : 9. What is the share of Rajeev?

Rajesh : Salesh = 5 : 4 🡪 10 : 8

Salesh : Rajeev = 8 : 9

Rajesh : Salesh : Rajeev = 10 : 8 : 9

Rajeevs share is (9 / 27) \* 36 000 = 4 000 \* 3 = 12 000

23. The principal Rs. A, borrowed at A% per annum simple interest, for A months will amount to:

a. A( 1+ A2/12) b. A((1 + A2)/1200) c. ( A + A3)/1200 d. A(1 + A2/1200)

N 🡪 years

Amount for SI = P + (PNR / 100)

= A + (A\*(A/12)\*A / 100)

= (A + A3 )/ 1200

24. Identify the set of all the positive integers.

a. 0,1,2,3….. b. 1,2,3,4 ….. c. 2,4,6,8…… d. 2,5,7,11……

25. A rectangle's length is four times its breadth. It has an area of 2500 square yards. What is the length of the rectangle?

Area of a rectangle = Length \* Breadth

L = 4B ; B = L / 4

Area of a rectangle = Length \* Breadth

2 500 = L \* L / 4

10 000 = L2

100 yards = L

26. How many litres of a 90% solution of concentrated acid needs to be mixed with a 75% solution of concentrated acid to get a 30 L solution of 78% concentrated acid?

x litres(Quantity) of 75 %(Value) concentrated acid 🡪 Ingradient 1 Cheap

y litres(Quantity) of 90%(Value) concentrated acid 🡪 Ingradient 2 Dear

(x+y)= 30 litres

30 litres of 78% concentrated acid 🡪 Mixture.

75% 90%

78%

12 : 3

4 : 1

4 Parts of 75% solution mixed with 1 part of 90% solution gives 5 parts of the mixture.

5 parts = 30 litres

1 part = 6 litres

4 parts = 24 litres

24 litres 75% solution mixed with 6 litres of 90% solution gives 30 litres of 78% concentrated solution

27. Which of the two is greater: 22/7 or 138/43?

(22 / 7) < (138 / 43)

946 < 966

28. A shopkeeper offers 'Buy 1, Get 1 Free' offer on a t-shirt marked at Rs. 2,400. If after a sale, the shopkeeper earns a profit of 33.33%, then what is the actual price of the t-shirt?

CP of 1 T-Shirt.

SP of 1 T-shirt should have been 2 400

SP of 2 T-shirts is 2 400

SP of 1 T-shirt is 1 200 ; P = 33.33%

CP \* (133.33 / 100) = 1200

CP = 1200 \* 3 / 4 = Rs . 900.