*** Choose The Right Answer From The Given Options.** [22]

1. The number with unit digit 0 or 5 is divisible by:

   (A) 2 (B) 3 (C) 4 (D) 5

   Ans. : D. 5

2. The number with unit digit 8 is divisible by:

   (A) 2 (B) 3 (C) 4 (D) 5

   Ans. : A. 2

3. The number with unit digit 0 is divisible by:

   (A) 5 (B) 10 (C) 15 (D) 2

   Ans. : B. 10

4. 1170 is not divisible by:

   (A) 10 (B) 9 (C) 5 (D) 4

   Ans. : D. 4

5. Prime factorization of 54 is:

   (A) 2 × 27 (B) 2 × 3 × 9 (C) 54 × 1 (D) 2 × 3

   Ans. : D. 2 × 3

6. 2 × 3 × 7 is the prime factorization of

   (A) 21 (B) 1237 (C) 237 (D) 42

   Ans. : D. 42

7. Which of the following number is the product of exactly three distinct prime number?

   (A) 20 (B) 165 (C) 45 (D) 147

   Ans. : B. 165

8. The largest number, which always divides the sum of any pair of consecutive odd numbers is

   (A) 2 (B) 4 (C) 6 (D) 8

   Ans. : B. 4

9. Sum of the number of primes between 16 to 80 and 90 to 100 is i

   (A) 20 (B) 18 (C) 17 (D) 16

   Ans. : C. 17

10. Which of the following pair is not coprime?

    (A) 11, 12 (B) 73, 74 (C) 84, 94 (D) 97, 98

Ans. : C. 84, 94

11. A number is divisible by 5, if it has

(A) Only 0 in its ones place (B) 0 in its tens place

(C) 0 or 5 in its ones place (D) 5 in its ones place

Ans. : C. 0 or 5 in its ones place

12. In which of the following pair, the first number is divisible by the second number? Use prime factoristaion.

(A) 75 and 30 (B) 90 and 60 (C) 125 and 75 (D) 75 and 15

Ans. : D. 75 and 15

13. Three prime numbers less than 20, whose product is 231.

(A) 3, 7 and 11 (B) 3, 5 and 7 (C) 7,11 and 13 (D) None of these

Ans. : A. 3,7 and 11

14. The number of common prime factors of 75,60,105 is

(A) 2 (B) 3 (C) 4 (D) 5

Ans. : A. 2

15. The number of distinct prime factors of the largest 4- digit number is

(A) 2 (B) 3 (C) 5 (D) 11

Ans. : B. 3

16. The number of distinct prime factors of the smallest 5- digit number is

(A) 2 (B) 4 (C) 6 (D) 8

Ans. : A. 2

17. Which of the following is not the common multiple of 2 and 5?

(A) 10 (B) 15 (C) 20 (D) 30

Ans. : B. 15

18. Which number is a common factor of 24 and 36?

(A) 5 (B) 8 (C) 12 (D) 18

Ans. : C. 12

19. Which of the following statements is true?

(A) All prime numbers are even

(B) The number 1 is a prime number.

(C) All composite numbers are greater than 1.

(D) The number 2 is a composite number.

Ans. : C. All composite numbers are greater than 1.

20. Which of the following numbers is not a composite number?

(A) 9 (B) 12 (C) 17 (D) 20

Ans. : C. 17

21. Which pair of number is coprime?

(A) 4 and 6 (B) 9 and 12 (C) 8 and 15 (D) 12 and 18

Ans. : C. 8 and 15

22. Which number is divisible by 8?

(A) 1244 (B) 1300 (C) 1456 (D) 1700

Ans. : C. 1456

*** a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.** [3]

23. Assertion (A) Tne number 9 and 25 are coprime. Reason (R) A number is said to be prime-, if it has only two factors 1 and the number itself.

(A) Both (A) and (R) are true and (R) is the correct explanation of (A).

(B) Both (A) and (R) are true but (R) is not the correct explanation of (A).

(C) (A) is true but (R) is false.

(D) (A) is false but (R) is true.

Ans. : B. Both (A) and (R) are true but (R) is not the correct explanation of (A).

24. Assertion (A) The common factors of two numbers can never be greater than the smaller number.
Reason (R) Factors are numbers that divide another number completely.

(A) Both (A) and (R) are true and (R) is the correct explanation of (A).

(B) Both (A) and (R) are true but (R) is not the correct explanation of (A).

(C) (A) is true but (R) is false.

(D) (A) is false but (R) is true.

Ans. : A. Both (A) and (R) are true and (R) is the correct explanation of (A).

25. Assertion (A) The number 1 is considered a prime number.
Reason (R) A prime number must have exactly two distinct factors.

(A) Both (A) and (R) are true and (R) is the correct explanation of (A).

(B) Both (A) and (R) are true but (R) is not the correct explanation of (A).

(C) (A) is true but (R) is false.

(D) (A) is false but (R) is true.

Ans. : D. (A) is false but (R) is true.

*** State Whether The Following Sentences Are True Or False.** [23]

26. 1 is a prime number.

Ans. : False

27. There are 8 prime numbers between 1-20.

Ans. : True

28. 12 is a prime number.

Ans. : False

29. 21 has 4 factors -1, 3, 7 and 21.

Ans. : True

30. 4, 6, 7, 8 and 9 are composite numbers,

Ans. : False (7 is a prime number)

31. Consecutive numbers are always coprime, (whose HCF is 1)

Ans. : True

32. The sum of primes cannot be a prime.

Ans. : False
2 + 3 = 5 is a prime number.

33. The product of primes cannot be a prime.

Ans. : True
The product of primes is a composite number.

34. An even number is composite.

Ans. : False
Even number 2 is not composite.

35. Two consecutive numbers cannot be both primes.

Ans. : False
The numbers 2 and 3 are consecutive and prime numbers.

36. Odd numbers cannot be composite.

Ans. : False
9 is an odd number and is composite having factors 1, 3 and 9.

37. Odd numbers cannot be written as sum of primes.

Ans. : False
9 is an odd number and the sum of prime number 7 + 2 = 9.

38. A number and its successor are always co-primes.

Ans. : True
A number and its successor have only one common factor.

39. 5 × 33 is the prime factorization of 165.

Ans. : False

40. If two numbers are divisible by a number, then their sum, difference and product are also divisible by that number.

Ans. : True

41. The largest 4-digit number divisible by 11 is 9999.

Ans. : True

42. Numbers not divisible by 2 are called even numbers.

Ans. : False

43. The common multiples of 3 and 4 start from 12.

Ans. : True

44. The common factors of 6 and 9 are 1 and 3.

Ans. : True

45. All even numbers are prime numbers.

Ans. : False

46. Composite numbers have more than two factors.

Ans. : True

47. All prime numbers are coprime with each other.

Ans. : True

48. A number is divisible by 4 if the last three digits form a number that is divisible by 4.

Ans. : False

*** Fill In The Blanks With Correct Alternative.** [19]

49. _____ is neither a prime nor a composite number.

Ans. : 1

50. _____ is the smallest prime number.

Ans. : 2

51. _____ is the only even prime number.

Ans. : 2

52. 1 is neither _____ nor _____ .

Ans. : Prime, composite

53. The number which has more than 2 factors is called a _____ number.

Ans. : Composite

54. _____ is the smallest composite number.

Ans. : 4

55. A prime number has only _____ factors.

Ans. : 2

56. The smallest odd prime number is _____ .

Ans. : 3

57. Number formed by multiplying the first three prime numbers is _____ .

Ans. : 30

58. Fill in the smallest digit to make the number divisible by 5 : 7164 _____ , 32197 _____

Ans. : 0,0

59. The smallest digit to make the number divisible by: 3 : 1 _____ 43, 47 _____ 05, _____ 316

Ans. : 1,2,2

60. The smallest digit to make the number divisible by: 6 : _____ 428, 9 _____ 52, 721 _____

Ans. : 1,2,2

61. The smallest digit to make the number divisible by: 4 : 2462 _____ , 91 _____ , 670 _____

Ans. : 0,00,0

62. The smallest digit to make the number divisible by: 8 : 1232 _____ , 59 16, 4642 _____

Ans. : 0,0,4

63. 15 is a multiple of _____ and _____ .

Ans. : 3 and 5

64. A number for which the sum of all its factors is equal to twice the number is called a _____ number.

Ans. : Perfect

65. The smallest prime number between 80 and 90 is _____

Ans. : 83

66. Numbers having more than two factors are called _____ numbers.

Ans. : Composite

67. If two numbers have'no common factors other than 1, they are said to be _____ .

Ans. : Coprime

*** Answer The Following Questions In One Sentence.[1 Marks Each]** **[42]**

68. Write the first 5 multiples of each of the following:
(a) 23
(b) 40

Ans. : (a) The first five multiples of 23 are 23,46, 69, 92, 115.
(b) The first five multiples of 40 are 40, 80, 120, 160, 200.

69. Write down the factors and multiples of 25.

Ans. : The factors of 25 are 1, 5 and 25
The multiples of 25 are 25, 50, 75, 100, 125, 150, and so on.

70. Are the multiples of 4 even?

Ans. : Multiples of 4 are: 4, 8, 12, 16, 20 ,
Yes, the multiples of 4 are even. Since 4 is an even number, the multiples of 4 are also even.

71. Are the multiples of 3 always the multiples of 6?

Ans. : Multiples of 3 are 3, 6, 9, 12, 15, 18, 21,... . Hence, the multiples of 3 are not always the multiples of 6.
As 9, 15, 21 are not multiples of 6.

72. What is the greatest common factor of 3 and 15?

Ans. : The factors of 3 are 1 and 3.
The factors of 15 are 1, 3, 5 and 15.
Therefore, the greatest common factor of 3 and 15 is 3.

73. Find the greatest common factor of 10 and 6.

Ans. : The factors of 6 are 1, 2, 3 and 6.
The factors of 20 are 1,2, 4, 5, 10 and 20.
Thus, the greatest common factor of 6 and 20 is 2.

74. Find the common multiples of 3 and 5.

Ans. : The multiples of 3 are 3, 6, 9, 12, 15, 18,21,v 24, 27, 30,..
The multiples of 5 are 5, 10, 15, 20, 25, 30, 35,40,...
Therefore, the common multiples of 3 and 5 are 15, 30, 45, 60, and so on.

75. Is 6 a prime number or composite number?

Ans. : 6 is a composite number as it can be divided by more than 2 numbers 1,2,3 and 6.
2. 1 is not considered as a prime number, why? Solution:Because it does not have distinct two factors
(i.e., 1 and the number itself are the same)

76. The numbers 13 and 31 are prime numbers. Both these numbers have the same digits 1 and 3. Find such pairs of prime numbers up to 100.

Ans. : 17 and 71, 37 and 73, 79 and 97 are the required pairs of prime numbers up to 100.

77. List all the composite numbers between the following:
(i) 10 and 18
(ii) 61 and 69
(iii) 91 and 96

Ans. : (i) Composite numbers between 10 and 18 are 12, 14, 15 and 16.
(ii) Composite numbers between 61 and 69 are 62, 63, 64, 65, 66 and 68.
(iii) Composite numbers between 91 and 96 are 92, 93, 94 and 95.

78. Choose all prime numbers:
12 19 7 8 9 11 15
13 24 27 23 34 37 36

Ans. : 19,7,11,13,23,37

79. Write all the composite numbers less than 30.

Ans. : 4, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20, 21, 22, 24, 25, 26, 27, 28

80. Write all the prime numbers less than 20.

Ans. : 2,3,5,7,11,13,17,19

81. Write all the composite numbers between 1 and 40.

Ans. : 4, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20, 21, 22, 24, 25, 26, 27, 28, 30, 32, 33, 34, 35, 36, 38, 39, 40.

82. Find five pairs of co-prime numbers.

Ans. : (3, 5); (4, 9); (7, 10); (20, 29); (31, 65).

83. Are 40 and 78 co-prime?

Ans. : Since two even numbers always have two common factors, 1 and 2, they can never be co-prime numbers. Thus, 40 and 78 are not co-prime numbers.

84. Find the prime factorization of 126000.

Ans. :

2	126000	3	2625
2	63000	5	875
2	31500	5	175
2	15750	5	35
3	7875		7

Hence, the prime factorization of 126000
$2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 5 \times 5 \times 7$

85. List the common prime factors of 256 and 156.

Ans. : Prime factorization of
256 = 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2
Prime factorization of 156 = 2 × 2 × 3 × 3
The common prime factor of 256 and 156 is 2.

86. List the common factors of 152 and 76.

Ans. : Prime factorization of 152 = 2 × 2 × 2 × 19
Prime factorization of 76 = 2 × 2 × 19
The common prime factors of 152 and 76 are 2 and 19.

87. Write down the divisibility rule for 9.

Ans. : The sum of the digits of the given number should be divisible by 9.
For example, 2979 is divisible by 9. (i.e.,) 2+9+7+9 = 27, which is divisible by 9.

88. Which of the following numbers are divisible by 2, 5 and 10?
(i) 149
(ii) 19400
(iii) 720345
(iv) 125370
(v) 3000000

Ans. : (ii) 19400
(iv) 125370
(v) 3000000

89. Which of the two nearest numbers to 19506 are divisible by 9?

Ans. : 19503, 19512

90. Find all multiples of 40 that lie between 310 and 410.

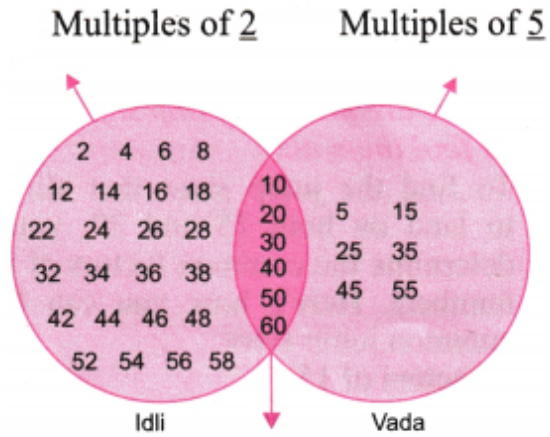
Ans. : Here, multiples df 40 are 40, 80, 120, 160, 200, 240, 280, 320, 360, 400, 440
Hence multiples of 40 that lie between 310 and 410 are 320, 360 and 400.

91. Find out other such numbers that are multiples of both 3 and 5. These numbers are called_____

Ans. : Numbers that are multiples of both 3 and 5 are called common multiples. The smallest common multiple of 3 and 5 is 15, and other such numbers include 30, 45, 60, and so on.

92. Let us now play the 'idli-vada ' game with different pairs of numbers:
(a) 2 and 5

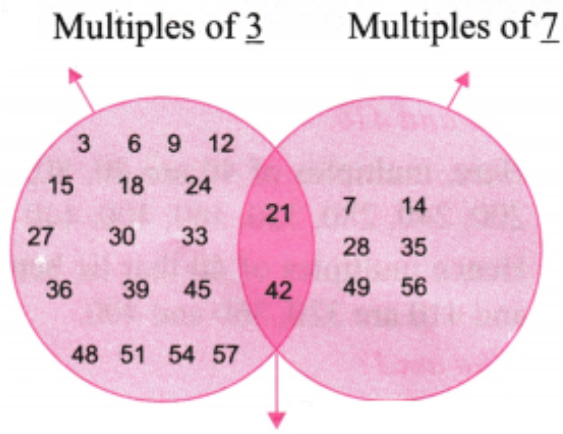
Ans. :



Common Multiples of 2 and 5

93. Let us now play the 'idli-vada ' game with different pairs of numbers:
(b) 3 and 7

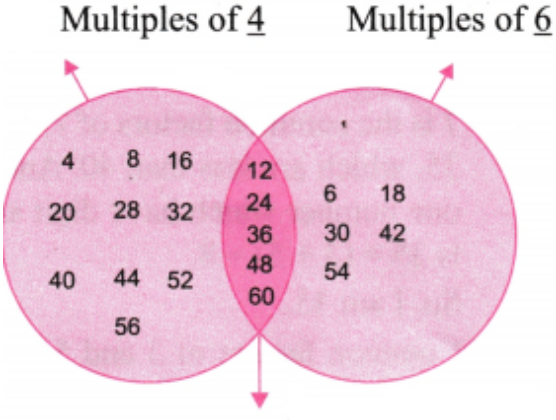
Ans. :



Common Multiples of 3 and 7

94. Let us now play the 'idli-vada ' game with different pairs of numbers:
(c) 4 and 6

Ans. :



Common Multiples of 4 and 6

95. Which of the following could be the other number: 2, 3, 5, 8,10?

Ans. : 2

96. Which numbers are both shaded and circled? What are these numbers called?

Ans. : 36,48,60 are both shaded and circled. These numbers are called common multiples.

97. How many prime numbers are there from 21 to 30?

Ans. : In total, there are 2 prime numbers between 21 and 30.
They are 23 and 29.

98. How many composite numbers are there from 21 to 30?

Ans. : Total number of composite numbers from 21 to 30 is 8.
They are 21,22,24,25, 26, 27, 28, 30.

99. Which of the following numbers are prime?
23, 51, 37, 26

Ans. : 23 and 37 have no divisors other than 1 and themselves, making them prime.

100. Write three pairs of prime numbers less than 20 whose sum is a multiple of 5.

Ans. : Three pairs of prime numbers less than 20 whose sum is a multiple of 5 are: (2, 3), (2, 13) and (7, 13).

101. The numbers 13 and 31 are prime numbers. Both these numbers have same digits 1 and 3. Find such pairs of prime numbers up to 100.

Ans. : The valid pairs of prime numbers up to 100 that consist of the same digits are: (13, 31), (17, 71), (37, 73) and (79, 97).

102. Find seven consecutive composite numbers between 1 and 100.

Ans. : The seven consecutive composite numbers are: 90,91,92, 93,94, 95,96.

103. Twin primes are pairs of primes having a difference of 2. For example, 3 and 5 are twin primes. So are 17 and 19. Find the other twin primes between l and 100.

Ans. : The twin primes between 1 and 100 other than 3 and 5,17 and 19 are as follows: (5, 7), (11, 13), (29, 31), (41, 43), (59, 61), (71, 73).

104. The first number has prime factorization 2 × 3 × 7 and the second number has prime factorization 3 × 7 × 11. Are they co-prime? Does one of them divide the other?

Ans. : The numbers share the common factors 3 and 7. So they are not co-prime since neither number contains all the factors of the other, neither can divide the other.

105. Guna says, “Any two prime numbers are co-prime”. Is he right?

Ans. : Yes, Guna is right. Any two prime numbers are co-prime as they do not have common factor other than 1 which means they are always co-prime. For example, 2

and 3, 5 and 7, 11 and 13.

106. Find the largest and smallest 4-digit numbers that are divisible by 4 and are also palindromes.

Ans. : Largest 4-digit number divisible by 4 and is also palindrome- 8888
Smallest 4-digit number divisible by 4 and is also palindrome- 2112.

107. Which of the following numbers are divisible by all of 2, 4, 5, 8 and 10: 572, 2352, 5600, 6000, 77622160?

Ans. : 5600, 6000, 77622160

108. What are all the multiples of 2 between 399 and 411?

Ans. : The multiples of 2 between 399 and 411 are 400, 402, 404, 406, 408,and 410.

109. Is 8536 divisible by 4?

Ans. : Since the last two digits of 8536 (which is 36) are divisible by 4, the original number 8536 is also divisible by 4.

*** Questions With Calculation.[2 Marks Each]** **[54]**

110. What is the difference between Factors and Multiples?

Ans. : The major differences between factors and multiples are provided below:

Factors	Multiples
A factor of a number is defined as an exact divisor of the given number.	A multiple of a number is defined as a number that is obtained by multiplying it by a natural number.
For example, the factors of 20 are 1, 2, 4, 5, 10, and 20.	For example, the multiples of 20 are 20, 40, 60, 80, 100, etc.

111. Find the common factors of:
(a) 4, 8 and 12
(b) 5,15 and 25

Ans. : (a) Given numbers are: 4, 8 and 12
Factors of 4 are 1,2, 4
Factors of 8 are 1, 2, 4, 8
Factors of 12 are 1, 2, 3, 4, 6, 12
Therefore, the common factors of 4, 8 and 12 are 1,2, and 4.

(b) Given numbers are: 5, 15 and 25
Factors of 5 are 1, 5
Factors of 15 are 1, 3, 5, 15
Factors of 25 are 1, 5, 25
Therefore, the common factors of 5, 15, and 25 are 1 and 5.

112. Which of the following is a prime number?
(a) 23
(b) 18
(c) 25
(d) 15

Ans. : (a) 23 = 1 × 23
Hence, 23 is a prime number.

(b) Since 18 = 1 × 18 or 6 × 3
Hence, 18 is not a prime number.

(c) Since 25 = 1 × 25 or 5× 5
Hence, 25 is not a prime number.

(d) Since 15 = 1 × 15 or 3 × 5
Hence, 15 is not a prime number.
Hence, the option (a) is correct.

113. Check whether the numbers are divisibility by 4:
(i) 23408
(ii) 100246

Ans. : (i) Given number is 23408
Here last 2 digits of 23408 is 08.
it is divisible by 4. $\left(\because \frac{8}{2} = 2\right)$
Hence 23408 is divisible by 4.

(ii) Given number is 100246
Now last 2 digits of 100246 is 46 which is not divisible by 4.
Hence 100246 is not divisible by 4.

114. At what number is 'idli-vada' said for the 10th time?

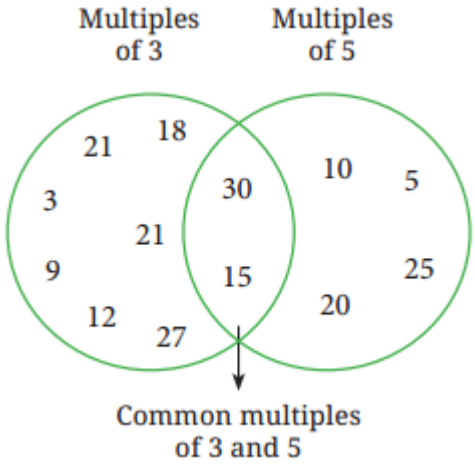
Ans. : To determine the 10th occurrence of "idli- vada"; we need to identify the numbers that are multiples of both 3 and 5.
The numbers for which "idli-vada" is said are the multiples of 15.
This sequence is: 15, 30, 45, 60, 75, 90, 105, 120, 135, 150,...
Thus, the 10th number for which players should say "idli-vada" is 150.

115. What if the game was played till 900? How would your answers change?

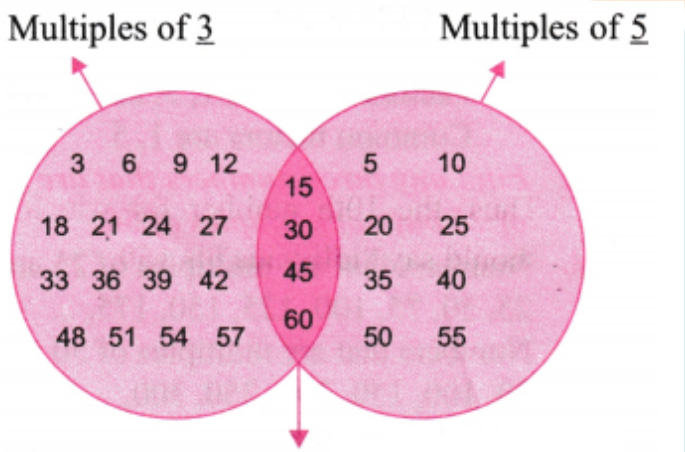
Ans. : There are 300 multiples of 3 between 1 and 900 and there are 180 multiples of 5 between 1 and 900. There are 60 multiples of 15 between 1 and 900.
(a) "idli" is said: 300 times (including the times "idli-vada" is said).

(b) “vada” is said: 180 times (including the times “idli-vada” is said).
(c) “idli-vada” is said: 60 times.

116. Is this figure somehow related to the ‘idli- vada’ game? (Hint: Imagine playing the game till 30. Draw the figure if the game is played till 60.)



Ans. : Yes, this figure is related to the ‘idli-vada’ game. Figure below for game played till 60.



117. Who am I?
(a) I am a number less than 40. One of my factors is 7. The sum of my digits is 8.
(b) I am a number less than 100. Two of my factors are 3 and 5. One of my digits is l more than the other.

Ans. : (a) 7 is the common factors of 7, 14, 21,28, 35, which are less than 40. And there is one number which have digit sum of 8, is 35 = (3 + 5) = 8.
So, I am 35.
(b) Common factors of 3 and 5 are 15, 30, 45, 60, 75,90, (which are less than 100). And there is one number which one of digit is 1 more than the other that is 45. So, I am 45.

118. A number for which the sum of all its factors is equal to twice the number is called a perfect number. The number 28 is a perfect number. Its factors are 1, 2, 4, 7, 14 and 28. Their sum is 56 which is twice 28. Find a perfect number between 1 and 10.

Ans. : The only perfect number between 1 and 10 is 6.

- Proper divisors are 1, 2, 3, 6
- Sum of proper divisors: 1 + 2 + 3 + 6 = 12
- 12 is twice of 6, hence 6 is a perfect number.

119. Find the common factors of:
(a) 20 and 28
(b) 35 and 50
(0 4, 8 and 12
(d) 5, 15 and 25

Ans. : (a) Factors of 20 are 1, 2, 4, 5, 10, 20 Factors of 28 are 1, 2, 4, 7, 14, 28 Common factors are 1, 2, 4
(b) Factors of 35 are 1, 5, 7, 35 Factors of 50 are 1, 2,'5, 10, 25, 50 Common factors are 1,5
(c) Factors of 4 are 1, 2, 4 Factors of 8 are 1, 2, 4, 8 Factors of 12 are 1, 2, 3, 4, 6, 12 Common factors are 1, 2, 4
(d) Factors of 5 are 1, 5 Factors of 15 are 1, 3, 5, 15 Factors of 25 are 1, 5, 25 Common factors are 1,5.

120. Find any three numbers that are multiples of 25 but not multiples of 50.

Ans. : Numbers that are multiples of 25 are 25, 50, 75, 100, 125, 150, 175, ...
Numbers that are multiples of 50 are 50, 100, 150, 200, 250,300,...
Hence, the numbers that are multiples of 25 but not multiples of 50 are 25, 75, 125, 175,...

121. Anshu and his friends play the 'idli-vada' game with two numbers, which are both smaller than 10. The first time anybody says 'idli-vada' is after the number 50. What could the two numbers be which are assigned 'idli'and 'vada'?

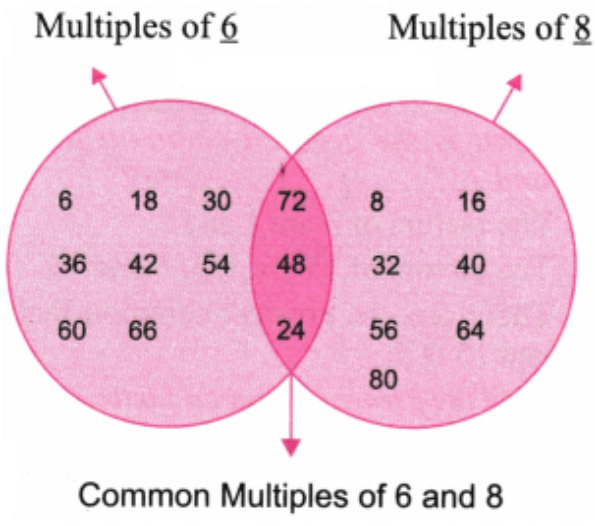
Ans. : If 'idli-vada' is said after number 50 it means that the least common multiple (LCM) of the two numbers must be slightly greater than 50. The LCM of 6 and 9 is 54,'.which is the first common multiple after 50, making 6 and 9 the possible numbers. Hence the two numbers could be 6 and 9.

122. In the treasure hunting game, Grumpy has kept treasures on 28 and 70. What jump sizes will land on both the numbers?

Ans. : Factors of 28 = 1, 2, 4, 7, 14, 28
Factors of 70 = 1,2, 5, 7, 10, 14, 35, 70
Common factors are 1, 2, 7 and 14
Hence jump sizes which will land at both 28 and 70 are 1, 2, 7 and 14.

123. In the diagram below, Guna has erased all the numbers except the common multiples. Find out what those numbers could be and fill in the missing numbers in the empty regions.

Ans. : Multiples of 6 Multiples of 8



Here 6 could also be replaced by 3.
As 24, 48, 72, are also common multiples of 3 and 8.

124. We see that 2 is a prime and also an even number. Is there any other even prime?

Ans. : No, 2 is the only even prime number. Since 2 is the only even number that meets the criteria of a prime number (its only divisors are 1 and 2), it is the only even prime number. All other even numbers are divisible by 2 and at least one other number, so they are not prime.

125. Are there an equal number of primes occurring in every row in the table on the previous page (See NCERT Textbook, Page 113)? Which decades have the least number of primes? Which have the most number of primes?

Ans. : There is not an equal number of primes in every row. The number of primes varies between rows. The decade 90-99 has the least number of primes with only 1 prime (97).
The decades 0-9 and 10-19 have the greatest number of primes, each with 4 primes.

126. Which of the following numbers is the product of exactly three distinct prime numbers:
45, 60, 91, 105, 330?

Ans. : Here, $45 = 3 \times 3 \times 5$ (2 distinct primes)
$60 = 2 \times 2 \times 3 \times 5$(3 distinct primes)
$91 = 7 \times 13$ (2 distinct primes)
$105 = 3 \times 5 \times 7$ (3 distinct primes)
$330 = 2 \times 3 \times 5 \times 11$ (4 distinct primes)
Number 105 is the product of exactly three distinct prime numbers i.e. $3 \times 5 \times 7$.

127. How many three-digit prime numbers can you make using each of 2, 4 and 5 once?

Ans. : 2, 4 and 5 cannot form a single prime number.
Because, when its units digit is 2 or 4 it is divided by 2, and when units digits is 5 it is divided by 5 so that's why 2, 4 and 5 cannot form a prime number.

128. Observe that 3 is a prime number, and 2 × 3 + 1 = 7 is also a prime. Are there other primes for which doubling and adding 1 gives another prime? Find at least five such examples.

Ans. : The five prime numbers for which doubling and adding 1 gives another prime are:
• 2 (since 2 × 2 + 1 = 5)
• 3 (since 2 × 3 + 1 = 7)
• 5 (since 2 × 5 + 1 = 11)
• 11 (since 2 × 11 + 1 = 23)
• 23 (since 2 × 23 + 1 = 47)

129. The prime factorization of a number has one 2, two 3s, and one 11. What is the number?

Ans. : To find the number, we multiply these prime factors together:
2 × 3 × 3 × 11 = 198
Thus, the number is 198.

130. Find three prime numbers, all less than 30, whose product is 1955.

Ans. : The prime factorization of 1955:
1955 = 5 × 17 × 23
All the factors are prime numbers and are less than 30.
Hence, the three prime numbers whose product is 1955 are 5, 17, and 23.

131. What is the smallest number whose prime factorization has:
(a) three different prime numbers?
(b) four different prime numbers?

Ans. : (a) The smallest prime numbers are 2, 3, and 5. To find the smallest number with these primes as factors, multiply them together:
2 × 3 × 5 = 30
So, the smallest number whose prime factorization has three different prime numbers is 30.
(b) The smallest four prime numbers are 2, 3, 5, and 7. To find the smallest number with these primes as factors, multiply them together:
2 × 3 × 5 × 7 = 210
Thus, the smallest number whose prime factorization has four different prime numbers is 210.

132. 2024 is a leap year (as February has 29 days). Leap years occur in the years that are multiples of 4, e×cept for those years that are evenly divisible by 100 but not 400.

(a) From the year you were born till now, which years were leap years?
(b) From the year 2024 till 2099, how many leap years are there?

Ans. : (i) Let the year you were born be 2010.
2010 (not divisible by 4)
2011 (not divisible by 4)
2012 (divisible by 4)
2013 (not divisible by 4)
2014 (not divisible by 4)
2015 (not divisible by 4)
2016 (divisible by 4)
2017 (not divisible by 4)
2018 (not divisible by 4)
2019 (not divisible by 4)
2020 (divisible by 4)
2021 (not divisible by 4)
2022 (not divisible by 4)
2023 (not divisible by 4)
2024 (divisible by 4)
Thus, the years that were leap years are 2012, 2016, 2020 and 2024.
(ii) Since, leap years occur in the years that are multiples of 4, except for those years that are evenly divisible by 100 but not 400. Therefore, the leap years from 2024 till 2099 are 2024, 2028, 2032, 2036, 2040, 2044, 2048, 2052, 2056, 2060, 2064, 2068, 2072, 2076, 2080, 2084, 2088, 2092 and 2096.
Hence, there are 19 leap years from the year 2024 till 2099.

133. Explore and find out if each statement is always true, sometimes true or never true. You can give e×amples to support your reasoning.
(a) Sum of two even numbers gives a multiple of 4.
(b) Sum of two odd numbers gives a multiple of 4.

Ans. : (a) Sometimes true. Sum of any two even numbers is not always divisible by 4. For e×ample, 6 + 4 = 10 which is not divisible by 4 whereas 2+2 = 4 which is divisible of 4.
(b) Sometimes true. Sum of two odd numbers can indeed be even but not necessarily a multiple of 4. For e×ample, 1 + 5 = 6 which is not a multiple of 4 whereas 1+3 = 4, which is a multiple of 4. Similarly 7 + 5 = 12, which is a multiple of 4.

134. The teacher asked if 14560 is divisible by all of 2, 4, 5, 8 and 10. Guna checked for divisibility of 14560 by only two of these numbers and then declared that it was also divisible by all of them. What could those two numbers be?

Ans. : If a number is divisible by 8, it will automatically be divisible by 4.
If a number is divisible by 10, it is also divisible by 2 and 5. Therefore, checking divisibility by 8 and 10 confirms divisibility by all other numbers (2, 4, 5).

Thus, the pair of numbers that Guna could check to determine that 14560 is divisible by all of 2, 4, 5, 8, and 10 is: 8 and 5.

135. Write two numbers whose product is 10000. The two numbers should not have 0 as the units digit.

Ans. : We need to write factors of 10000.
10000= 10 × 10 × 10 × 10
= 2 × 5 × 2 × 5 × 2 × 5 × 2 × 5
So, 2 × 2 × 2 × 2 = 16 and 5 × 5 × 5 × 5 = 625.
Hence, 16 and 625 are the two numbers whose product is 10000.

136. Find numbers between 330 and 340 that are divisible by 4. Also, find numbers between 1730 and 1740, and 2Q30 and 2040, that are divisible by 4. What do you observe?

Ans. : The numbers between 330 and 340 that are divisible by 4 are 332, 336, and 340. The numbers between 1730 and 1740 that are divisible by 4 are 1732, 1736, and 1740. The numbers between 2030 and 2040 that are divisible by 4 are 2032, 2036, and 2040.

*** Questions With Calculation.[3 Marks Each]** **[42]**

137. Check whether or not the following are composite numbers
(i) 98
(ii) 47
(iii) 35
(iv) 69
(v) 108
(vi) 19
(vii) 21
(viii) 103

Ans. : (i) The factors of 98 are 1, 2, 7, 14, 49 and 98.
So, 98 is a composite number.

(ii) The factors of 47 are 1 and 47.
So, 47 is not a composite number. It is a prime number.

(iii) The factors of 35 are 1, 5, 7, 35.
So, 35 is a composite number.

(iv) The factors of 69 are 1, 3, 23, 69.
So, 69 is a composite number.

(v) The factors of 108 are 1,2, 3,4, 6, 9, 12, 18, 27,36, 54, and 108.

So, 108 is a composite number.

(vi) The factors of 19 are 1 and 19 So, 19 is not .a composite number.

(vii) The factors of 21 are 1, 3, 7, 21.
So, 21 is a composite number.

(viii) The factors of 103 are 1 and 103
So, 103 is not a composite number.

138. Check if the given pair of numbers are co-primes:
(i) 15 and 38
(ii) 25 and 26
(iii) 12 and 18

Ans. : (i) Here factors of 15 are 1, 3, 5, 15 and factors of 38 are 1,2, 19, 38
∴ HCF of 15 and 38
= common factors of 15 and 38 = 1
Since HCF of 15 and 38 is 1.
Hence 15 and 38 are co-primes.

(ii) Here factors of 25 are 1, 5, 25 and factors of 26 are 1,2, 13, 26
∴ common factors of 25 and 26 = 1
Since HCF of 25 and 26 is 1.
Hence 25 and 26 are co-primes.

Here factors of 12 are: 1, 2, 3, 4, 6, 12 and factors of 18 are: 1, 2, 3, 6, 9, 18
∴ HCF of 12 and 18
= common factors of 12 and 18 = 1,2 and 3
Since 1,2 and 3 are factors of 12 and 18.
Hence they are not co-primes.

139. Find the prime factorization of the following numbers:
(i) 18
(ii) 39
(iii) 385
(iv) 45
(v) 52
(vi) 64
(vii) 390
(viii) 2520
(ix) 1210
(x) 1260

(xi) 1024
(xii) 2520

Ans. : (i) 18 = 1 × 2 × 3 × 3
(ii) 39 = 1 × 3 × 13
(iii) 385 = 1 × 5 × 7 × 11
(iv) 45 = 1 × 3 × 3 × 5
(v) 52 = 1 × 2 × 2 × 13
(vi) 64 = 2 × 2 × 2 × 2 × 2 × 2
(vii) 390 = 2 × 3 × 5 × 13
(viii) 2520 = 1 × 2 × 2 × 2 × 3 × 3 × 5 × 7
(ix) 1210 = 2 × 5 × 11 × 11
(x) 1260 = 1 × 2 × 2 × 3 × 3 × 5 × 7
(xi) 1024 = 1 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2
(xii) 2520 = 1 × 2 × 2 × 2 × 3 × 3 × 5 × 7

140. In each of the following numbers without doing actual division, determine Whether the first number is divisible by the second number:
(i) 3409122;6
(ii) 11309634; 8
(iii) 3501804; 4

Ans. : (i) Let's determine if 3409122 is divisible by 6.
The divisibility rule for 6 combines the rules for 2 and 3.
Here 3409122 is even number because its last digit is 2.
Hence given number is divisible by 2.

Also the sum of its digits is
3 + 4 + 0 + 9 + 1 + 2 + 2 = 21
which is divisible by 3.
Thus given number is also divisible by 3.
Hence 3409122 is also divisible by 6.

(ii) Given number is 11309634
Here last 3 digits of 11309634 is 634
Now

$$\begin{array}{r} 8\overline{)634}(79 \\ 56 \\ \hline 74 \\ 72 \\ \hline 2 \end{array}$$

which is not divisible by 8.
Hence 11309634 is not divisible by 8.

(iii) Given number is 3501804
and last 2 digits of 3501804 is 04.
It is divisible by 4.
Hence 3501804 is divisible by 4.

141. If the game is played for the numbers from 1 till 90, find out:
(a) How many times would the children say 'idli ' (including the times they say 'idli- vada')?
(b) How many times would the children say 'vada ' (including the times they say 'idli-vada')?
(c) How many times would the children say 'idli-vada '?

Ans. : (a) Idli is said for multiples of 3. Between 1 and 90 the multiples of 3 are 3, 6, 9, 12, 15, 18, ... 90.
There are 30 such numbers.
Hence the children would say idli 30 times.
(b) Vada is said for multiples of 5. Between 1 and 90 the multiples of 5 are 5, 10,15, 20, 25,...
There are 18 such numbers.
(c) Idli-Vada is said for multiples of both 3 and 5, which is multiple of 15. Between 1 and 90, there are 15, 30,45,60,75,90. There are 6 such numbers.

142. Find the smallest number that is a multiple of all the numbers from 1 to 10 except for 7.

Ans. : To find smallest number that is a multiple of all the numbers between 1 and 10 (both inclusive), let us first find the LCM of all the numbers between 1 and 10 except 7.
Here, $1 = 1$
$2 = 2$
$3 = 3$
$4 = 2 \times 2$
$5 = 5$
$6 = 2 \times 3$
$8 = 2 \times 2 \times 2$
$9 = 3 \times 3$
$10 = 2 \times 5$
$\therefore$ LCM = Product of the highest power of the prime factors including other factors
$= 2 \times 2 \times 2 \times 3 \times 3 \times 5$
$= 360$
Hence, the smallest number that is a multiple of all the numbers from 1 to 10 except for 7 is 360.

143. Find the smallest number that is a multiple of all the numbers from 1 to 10.

Ans. : To find the smallest number that is divisible by all the numbers from 1 to 10 (both inclusive), let us first find the LCM of all the numbers between 1 and 10 (both inclusive)

we have

1 = 1

2 = 2

3 = 3

4 = 2 × 2

5 = 5

6 = 2 × 3

7 = 7

8 = 2 × 2 × 2

9 = 3 × 3

10 = 2 × 5

∴ LCM = Product of the highest power of the prime factors including other factors = 2 × 2 × 2 × 3 × 3 × 5 × 7

= 8 ×9 × 5 × 7 = 2520

The smallest number that is a multiple of all the numbers from 1 to 10 is 2520

144. What jump size can reach both 15 and 30? There are multiple jump sizes possible. Try to find them all. f

Ans. : To find the jump sizes that allow Jumpy to land on both 15 and 30, you need to determine the common factors of these two numbers. Here's how you can find these common jump sizes:

Factors of 15:

• 15 can be factored into: 15 = 3 × 5

• The factors of 15 are: 1, 3, 5, 15

Factors of 30:

• 30 can be factored into: 30 = 2 × 3 × 5

• The factors of 30 are: 1, 2, 3, 5, 6, 10, 15, 30

The common factors between these two lists are: 1, 3, 5, 15. So, the jump sizes that will allow Jumpy to land on both 15 and 30 are the common factors of 15 and 30.

Therefore, the jump sizes that will enable Jumpy to land on both 15 and 30 are: 1, 3, 5, 15

145. Find the prime factorization of these numbers without multiplying first.

(a) 56 × 25

(b) 108 × 75

(c) 1000 × 81

Ans. : (a) Prime factors of 56 = 2 × 2 × 2 × 7

Prime factors of 25 = 5 × 5

Combined prime factorization of 56 × 25 = 2 × 2 × 2 × 7 × 5 × 5

(b) Prime factors of 108 = 2 × 2× 2 × 3 × 3
Prime factors of 75 = 3 × 5 × 5
Combined prime factorization of 108 × 75 = 2 × 2 × 3 × 3 × 3 × 3 × 5 × 5
(c) Prime factors of 1000 = 2 × 2 × 2 × 5 × 5 × 5
Prime factors of 81 = 3 × 3 × 3 × 3
Combined prime factorization of 1000 × 81 = 2 × 2 × 2 × 5 × 5 × 5 × 3 ×3 × 3 × 3

146. Which of the following pairs of numbers are co-prime?
(a) 18 and 35
(b) 15 and 37
(c) 30 and 415

Ans. : (a) Here factors of 18 = 1 × 2 × 3 × 3 and factors of 35 = 1 × 5 × 7
No common factor other than 1.
Hence 18 and 35 are co-prime numbers.
(b) We have factors of 15 = 1 × 3 × 5 and factors of 37 = 1 × 37
No common factor other than 1.
Hence 15 and 37 are co-prime numbers.
(c) Given numbers are 30 and 415 Here factors of 30 = 1 × 2 × 3 × 5 and factors of 415 = 5 × 83
Clearly 5 is a common factor of 30 and 415.
Hence 30 and 415 are not co-prime numbers.

147. Are the following pairs of numbers co-prime? Guess first and then use prime factorization to verify your answer.
(a) 30 and 45
(b) 57 and 85
(c) 121 and 1331
(d) 343 and 216

Ans. : (a) Factors of 30 and 45:
30 = 2 × 3 × 5,
45 = 3 × 3 × 5
Common factors: 3 × 5 = 15, hence 30 and 45 are not a pair of co-prime numbers.
(b) Factors of 57 and 85:
57 = 3 × 19,
85 = 5 × 17
No common factors other than 1, hence 57 and 85 are a pair of co-prime numbers.
(c) Factors of 121 and 1331:
121 = 11 × 11,
1331 = 11 × 11 × 11
Common factors: 11 × 11 = 121, hence 121 and 1331 are not a pair of co-prime numbers.
(d) Factors of 343 and 216:

343 = 7 × 7 × 7,

216 = 2 × 2 × 2 × 3 × 3 × 3

No common factors other than 1, hence 343 and 216 are a pair of co-prime numbers.

148. Is the first number divisible by the second? Use prime factorization.

(a) 225 and 27

(b) 96 and 24

(c) 343 and 17

(d) 999 and 99

Ans. : (a) Prime Factors of 225 and 27:

225 = 3 × 3 × 5 × 5 and 27 = 3 × 3 × 3

Since 225 contains 3 × 3 and does not have enough factors of 3 to match 3 × 3 × 3, 225 does not have sufficient factors to be divisible by 27.

Therefore, 225 is not divisible by 27.

(b) Prime Factors of 96 and 24:

96 = 2 × 2 × 2 × 2 × 2 × 3 and 24 = 2 × 2 × 2 × 3.

Since 96 includes the required factors to match those in 24, it is divisible by 24.

(c) Prime Factors of 343 and 17:

343 = 7 × 7 × 7 and 17 = 1 × 17

Since the prime factorization of 343 contains the prime factor 7 and not 17, 343 is not divisible by 17.

Thus, 343 is not divisible by 17.

(d) Prime Factors of 999 and 99: t

999 = 3 × 3 × 3 × 37 and 99 = 3 × 3 × 11

Since 999 does not include the factor 11 required for 99, 999 is not divisible by 99.

149. Find the remainders obtained when each of the following numbers are divided by

(i) 10

(ii) 5

(iii) 2.

78, 99, 173, 572, 980, 1111, 2345

Ans. : Here we have to divide 78 by 10, 5 and 2 then

(*i*) $10\overline{)78}(7$
70
8 — Remainder
$\therefore$ Remainder = 8.

(*ii*) $5\overline{)99}(19$
5
49
45
4
$\therefore$ Remainder = 4

(*iii*) $2\overline{)78}(39$
6
18
18
$\times$
$\therefore$ Remainder = 0

Now do yourself:
99/10: Remainder = 9, 99/5: Remainder = 4, 99/2: Remainder = 1
173/10: Remainder = 3, 173/5: Remainder = 3, 173/2: Remainder = 1
572/10: Remainder = 2, 572/5: Remainder = 2, 572/2: Remainder = 0
980/10: Remainder = 0,980/5: Remainder = 0, 980/2: Remainder = 0
1111/10: Remainder= 1,1111/5: Remainder= 1, 1111/2: Remainder = 1
2345/10: Remainder 5,2345/5: Remainder = 0, 2345/2: Remainder = 1

150. Consider these statements:
(a) Only the last two digits matter when deciding if a given number is divisible by 4.
(b) If the number formed by the last two digits is divisible by 4, then the original number is divisible by 4.
(c) If the original number is divisible by 4, then the number formed by the last two digits is divisible by 4.
Do you agree? Why or why not?

Ans. : (a) Yes, that's correct. When determining if a number is divisible by 4, only the last two digits of the number matter. This is because 100 is divisible by 4, so the divisibility rule for 4 focuses on whether the number formed by the last two digits is divisible by 4.

(b) Yes, that's correct. If the number formed by the last two digits of a given number is divisible by 4, then the original number is also divisible by 4.
(c) Yes, that's correct. If the original number is divisible by 4, the last two digits of the number will indeed be divisible by 4.

*** Questions With Calculation.[5 Marks Each]** **[15]**

151. Look at the list of primes till 106. What is the smallest difference between two successive primes? What is the largest difference?

Ans. : To find the smallest difference between two successive prime numbers up to 100, let's list the prime numbers in that range and calculate the differences between each pair: Prime numbers up to 100: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

Differences between successive primes:

- 3 – 2 = 1
- 5 – 3 = 2
- 7 – 5 = 2
- 11 – 7 = 4
- 13 – 11 = 2
- 17 – 13 = 4
- 19 – 17 = 2
- 23 – 19 = 4
- 29 – 23 = 6
- 31 – 29 = 2
- 37 – 31 = 6
- 41 – 37 = 4
- 43 – 41 = 2
- 47 – 43 = 4
- 53 – 47 = 6
- 59 – 53 = 6
- 61 – 59 = 2
- 67 – 61 = 6
- 71 – 67 = 4
- 73 – 71 = 2
- 79 – 73 = 6
- 83 – 79 = 4
- 89 – 83 = 6
- 97 – 89 = 8

The smallest difference between two successive primes up to 100 is 1 (between the primes 2 and 3).

The largest difference between two successive primes up to 100 is 8, which occurs between the primes 89 and 97.

152. Identify whether each statement is true or false. Explain.
(a) There is no prime number whose units digit is 4.
(b) A product of primes can also be prime.
(c) Prime numbers do not have any factors.
(d) All even numbers are composite numbers.
(e) 2 is a prime and so is the next number, 3. For every other prime, the next number is composite.

Ans. : (a) True.
A prime number must end in 1, 3, 7, or 9 (except for the number 2) because any number ending in 0, 2, 4, 6 or 8 is divisible by 2.
Thus, there is no prime number whose units digit is 4.
(b) False.
A product of prime numbers is only prime if it involves exactly one prime number. When you multiply two or more prime numbers together, the result is always a composite number, not a prime. As this number has 2 factors now.
(c) False.
Prime numbers have exactly two factors 1 and itself.
(d) False.
The number 2 is an even number, but it is not composite. As it is a prime number.
(e) True.
For every prime number greater than 2, the next number is composite.

153. Find the prime factorizations of the following numbers: 64, 104, 105, 243, 320, 141, 1728, 729, 1024, 1331, 1000.

Ans. : (a) The prime factorization of 64 is $2 \times 2 \times 2 \times 2 \times 2 \times 2$.
(b) The prime factorization of 104 is $2 \times 2 \times 2 \times 13$.
(c) The prime factorization of 105 is $3 \times 5 \times 7$.
(d) The prime factorization of 243 is $3 \times 3 \times 3 \times 3 \times 3$.
(e) The prime factorization of 320 is $2 \times 2 \times 2 \times 2 \times 2 \times 5$.
(j) The prime factorization of 141 is 3×47.
(g) The prime factorization of 1728 is $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3$.
(h) The prime factorization of 729 is $3 \times 3 \times 3 \times 3 \times 3 \times 3$.
(f) The prime factorization of 1024 is $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$.
(j) The prime factorization of 1331 is $11 \times 11 \times 11$.
(k) The prime factorization of 1000 is $2 \times 2 \times 2 \times 5 \times 5 \times 5$.

*** Match the following.** **[12]**

154.

Column A	Column B
(i) 2023	(a) divisible by 3
(ii) 24804	(b) divisible by 11
(iii) 12892	(c) divisible by 8

(iv) 6016	(d) divisible by 7

Ans. :

Column A	Column B
(i) 2023	(d) divisible by 7
(ii) 24804	(a) divisible by 3
(iii) 12892	(b) divisible by 11
(iv) 6016	(c) divisible by 8

155.

Column A	Column B
(i) The smallest odd composite number	(a) 1
(ii) Number of common factor of 3 and 5.	(b) 4
(iii) The smallest composite number	(c) 3
(iv) Smallest even prime number	(d) 9
	(e) 2

Ans. :

Column A	Column B
(i) The smallest odd composite number	(d) 9
(ii) Number of common factor of 3 and 5.	(a) 1
(iii) The smallest composite number	(b) 4
(iv) Smallest even prime number	(e) 2

156.

Column A	Column B
(i) 33	(a) Factor of 19
(ii) 12	(b) Multiple of 9
(iii) 14	(c) Multiple of 11
(iv) 19	(d) Multiple of 7
	(e) Multiple of 20

Ans. :

Column A	Column B
(i) 33	(c) Multiple of 11
(ii) 12	(f) Factor of 24
(iii) 14	(d) Multiple of 7
(iv) 19	(a) Factor of 19

----- -----