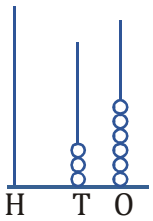
EXERCISE-01

Multiple Choice Questions

1. The factors of the number shown on the spike abacus is



(1) 0 (2) 7
(3) 5 (4) 9

2. Ravi wrote two digits of a 3-digit number on the blackboard as shown below

1	?	3

Find the missing digit if number has 11 and 13 as factors.

(1) 2 (2) 4
(3) 6 (4) 8

3. The number of numbers having exactly one factor is

(1) 0 (2) 2
(3) 1 (4) 3

4. 48 is not a multiple of

(1) 4 (2) 12
(3) 18 (4) 16

5. The greatest 2- digit even multiple of 5 is

(1) 95 (2) 100
(3) 92 (4) 90

6. The sum of the factors of 25 is

(1) 7 (2) 6
(3) 31 (4) 26

7. The number of primes between 1 and 100 are

(1) 20 (2) 26
(3) 25 (4) 27

8. The least prime number with consecutive digits is

(1) 31 (2) 23
(3) 43 (4) 67

9. Which of the following is a pair of co-primes?

(1) 20,25 (2) 18, 35
(3) 15, 63 (4) 27, 81

10. Which of the following is a pair of twin primes between 50 and 70?

(1) 51, 53 (2) 57, 59
(3) 59, 61 (4) 63, 65

11. Identify which number pairs are relatively prime?

I. 21, 32 II. 30, 36 III. 49, 72

(1) I and II
(2) II and III
(3) I and III
(4) I, II and III

12. 432650 is not divisible by

(1) 2 (2) 5
(3) 10 (4) 4

13. If a number is divisible by both 5 and 8, then it must be divisible by

(1) 5 + 8 (2) 8 – 5
(3) 5 × 8 (4) 5 ÷ 8

14. The number 15938* is divisible by 6. The unknown non-zero digit marked as * will be

(1) 1 (2) 2
(3) 4 (4) 6

15. Without actual division, which of the following numbers is exactly divisible by 2, 3 and 5?

(1) 185 (2) 5875
(3) 3540 (4) 709

16. 9 * 8071 is divisible by 11. The value of the missing digit is
(1) 4 (2) 1
(3) 6 (4) 5

17. 7120 is not divisible by
(1) 2 (2) 4
(3) 6 (4) 8

18. Which expression is the prime factorisation of the smallest 5-digit number?
(1) 2 × 2 × 2 × 5 × 5 × 5 × 5
(2) 2 × 2 × 2 × 2 × 5 × 5 × 5 × 5
(3) 2 × 2 × 2 × 2 × 2 × 5 × 5 × 5
(4) 2 × 2 × 2 × 5 × 5 × 5

19. In which of the following expressions, prime factorisation has been done?
(1) 24 = 2 × 2 × 6
(2) 76 = 2 × 2 × 19
(3) 132 = 11 × 3 × 4
(4) 140 = 1 × 2 × 5 × 7

20. The HCF of two consecutive numbers is always
(1) 0
(2) 1
(3) 2
(4) product of numbers

21. The greatest common factor of 120 and 192 is
(1) 12 (2) 2
(3) 3 (4) 24

22. Which pair of numbers has a HCF that is not a prime number?
(1) 60, 231 (2) 15, 80
(3) 24, 26 (4) 30, 42

23. Add parentheses to make the equation 5 + 7 × 2 – 3 = 21 correct
(1) 5 + (7 × 2) – 3 (2) 5 + 7 × (2 – 3)
(3) (5 + 7) × 2 – 3 (4) 5 + (7 × 2 – 3)

24. What mathematical operation should replace'?' in the equation?
2 ? 6 – 12 ÷ 4 + 2 = 11
(1) + (2) –
(3) × (4) ÷

25. Which operation you perform first when you evaluate 65 – (8 + 35 ÷ 5 × 4)?
(1) Addition (2) Division
(3) Multiplication (4) Subtraction

26. Which of the following should be performed first to simplify the expression?
24 × 3 + (16 ÷ 8) – 12 ÷ 2 + 1
(1) 24 × 3 (2) 16 ÷ 8
(3) 12 ÷ 2 (4) 2 + 1

27. The maximum number of students among whom 1001 pens and 910 pencils can be distributed, such that each student gets the same number of pens and same number of pencils is
(1) 910 (2) 1001
(3) 91 (4) 191

28. The length and breadth of a room are 16.58 m and 8.32 m respectively. What is the greatest length of the side of a square tile required for pairing the floor of the room (No space is to be left in the room without a tile)?
(1) 2.4 cm (2) 4 cm
(3) 2 cm (4) 3.2 cm

29. When teams of same size are formed from three groups of 512, 430 and 489 students separately, 8, 10 and 9 students respectively are left out. What could be the largest size of the team?
(1) 6 (2) 12
(3) 18 (4) 20

30. Which of the following is the LCM of 9, 14 and 21?
(1) 189 (2) 126
(3) 252 (4) 378

31. The LCM of two prime numbers x and y (x > y) is 77. The value of 2y – x is
(1) 2 (2) 3
(3) 1 (4) 0

32. Three city tour buses leave the bus stop at 9.00 AM. Bus A returns after every 30 minutes, bus B returns after every 20 minutes and bus C returns after every 45 minutes. What is the next time, the buses will all return at the same time to the bus stop?
(1) 1:00 PM (2) 12 noon
(3) 7 PM (4) 11:30 PM

33. The least number of 5-digits which is exactly divisible by 16, 24, 36 and 54 is
(1) 10638 (2) 10368
(3) 13068 (4) 1084

34. Find the greatest number of 5-digits which when divided by 3, 5, 8 and 12 will have 2 as remainder.
(1) 99999 (2) 99958
(3) 99960 (4) 99962

35. The HCF of two numbers is 11 and their LCM is 7700. If one of the numbers is 275, then the other is
(1) 279 (2) 283
(3) 308 (4) 318

36. Product of two co-prime numbers is 117. Their LCM should be
(1) 1
(2) 117
(3) Equal to their HCF
(4) Cannot be calculated

37. The LCM and HCF of two numbers are 4125 and 25 respectively. One number is 375. Find by how much is the second number less than the first?
(1) 100 (2) 50
(3) 75 (4) 25

38. $\frac{1219}{1431}$ when reduced to its simplest form, by dividing the numerator and denominator by their HCF is
(1) $\frac{33}{47}$ (2) $\frac{23}{27}$
(3) $\frac{47}{49}$ (4) $\frac{37}{43}$

39. Kim packed 6 baskets with identical fruits. It was the greatest number she should pack and use all the fruits. Which of these are in her fruit list?
(1) 24 oranges, 36 bananas,10 pears
(2) 12 oranges, 30 bananas, 45 pears
(3) 42 oranges, 18 bananas, 72 pears
(4) 60 oranges, 54 bananas, 32 pears

40. Consider the statements
The numbers 24984, 26748 and 28584 are
1. divisible by 3 2. divisible by 9
3. divisible by 8
which of these are correct?
(1) 1, 2 and 3 (2) 1 and 2
(3) 2 and 3 (4) 1 and 3

True or false

1. The number of factors of a given number are infinite.

2. There exists a natural number which has no factor at all.

3. The product of two numbers is always composite.

4. (2,3,5) is the smallest known prime triplet.
5. All primes are odd.
6. The product of three odd numbers is always odd.
7. The natural number 4 can be expressed as a sum of two odd primes 1 and 3.
8. All numbers divisible by 3 are also divisible by 9.
9. If 112233 is a number divisible by 11, then 332211 is also divisible by 11.
10. The LCM of two different numbers is always greater than either of the numbers.
11. The LCM of two prime numbers is always their product.
12. If one of the two numbers is a factor of the other, then their LCM is always equal to the factor.
13. The HCF of two numbers is always a factor of their LCM.
14. Two consecutive natural numbers are always co-prime.
15. The HCF of two consecutive multiples of 10 is always 10.

Fill in the blanks

1. In the mathematical sentence $3 \times 8 = 24$, 24 is the _____ of 3 and 8.
2. The least non-zero factor of any number is _____.
3. A number which has more than two factors is called a _____.
4. Pairs of primes, that have a difference of _____ are called twin primes.
5. The sum of three odd numbers is always _____.(even/odd)
6. A number is divisible by 4, if the number formed by the last _____digits of the number is divisible by _____.
7. A number is divisible by _____, if its ones digit is 0 or 5.
8. If a number is divisible by both 5 and 3, it is necessarily divisible by _____.
9. The prime numbers 17 and 71 have the same digits 1 and 7, but in reverse order. Other such pair of primes, less than 100 is _____and _____.
10. The factors of 27 are _____.

Match the column

Match the following

Column-I		Column-II	
(1)	A number divisible by 2 but not by 4	(a)	48
(2)	A number divisible by 3 but not by 6	(b)	28
(3)	A number divisible by 4 but not by 8	(c)	10
(4)	A number divisible by 4 and 8, but not by 32	(d)	15

ANSWER KEY

Multiple choice questions

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	4	2	3	3	4	3	3	2	2	3	3	4	3	3	3
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	2	3	2	2	2	4	4	3	3	2	2	3	3	2	2
Question	31	32	33	34	35	36	37	38	39	40					
Answer	2	2	2	4	3	2	1	2	3	2					

True or false

1. False **2.** False **3.** False **4.** False

5. False **6.** True **7.** False **8.** False

9. True **10.** False **11.** True **12.** False

13. True **14.** True **15.** True

Fill in the blanks

1. Multiple **2.** 1 **3.** Composite Number

4. Two **5.** Odd **6.** Two, 4 **7.** 5

8. 15 **9.** 13,31 ; 37,73 ; 79,97 **10.** 1,3,9,27

Match the column

(1) → c ; (2) → d ; (3) → b ; (4) → a

EXERCISE-02

Very short answer type question

1. Determine whether:
(i) 39 is a factor of 13962
(ii) 43 is a factor of 85027

2. Tell whether each number is prime (P) or composite (C)?
(i) 39 (ii) 43
(iii) 58 (iv) 87
(v) 97

3. Write:
(i) All even prime numbers
(ii) Prime numbers between 90 and 100
(iii) Smallest odd composite number
(iv) Pair of twin primes between 70 and 80
(v) Number that is neither prime nor composite.

4. Replace the star (*) by the smallest number, so that
(i) 78 * 964 may be divisible by 9
(ii) 75 * may be divisible by 4
(iii) 2 * 345 may be divisible by 3

5. Use prime factorisation method to determine the HCF of each of the following :
(i) 22, 34 (ii) 6, 10, 11, 14
(iii) 520, 1430 (iv) 54, 60, 72, 80

6. Find the least number which is exactly divisible by 14, 21, 24 and 42.

Short answer type question

7. Find the sum of all the prime numbers between 1 and 10.

8. Write:
(i) The first 3-digit even multiple of 7
(ii) Even multiples of 13, less than 100
(iii) Multiples of 5 between 52 and 76

9. Test the divisibility of the following numbers by 11.
(i) 61809 (ii) 70169803
(iii) 123574 (iv) 3178965

10. Test the divisibility of each of the following by 4 and 8.
(i) 6000 (ii) 41084
(iii) 3273 (iv) 1704

11. Check the divisibility of :
(i) 6125, 50105 and 32950 by 25
(ii) 17852, 639210, 61233 by 6
(iii) 3032, 2016, 3750 by 12

12. Determine the HCF of the numbers in each of the following by continued division method.
(i) 2312, 3434 (ii) 144, 180, 192
(iii) 1624, 522, 1276

13. Find the LCM of the following by prime factorisation method.
(i) 10, 12, 18 (ii) 18, 20, 30
(iii) 9, 15, 18, 20

14. Simplify the following:
(i) $(39 \div 3) + 7$
(ii) $15 + 4 \div (5 - 3)$
(iii) $17 + (3 \times 5) - 6$
(iv) $63 - \{(24 - 20) \times 15\}$
(v) $8 - \{4\ (10 - 8) - 16 \div 2\}$
(vi) $(17 - 9) \times \{18 \div (4 + 5)\}$
(vii) $27 \div \{8 + (20 \div 5 - 3)\}$
(viii) 73 of $[45 - \{6 \times 7 + (23 - 4 \text{ of } 5)\}]$

Long answer type question

15. Find the LCM of the following by division method.
(i) 20, 25, 30, 50
(ii) 8, 12, 20, 30, 80
(iii) 9, 12, 18, 24, 27
(iv) 22, 54, 108, 135, 198

16. Jai and Reena are making sandwiches for a class picnic. They have 63 tomato slices, 84 cheese slices and 126 cucumber slices. What is the greatest number of slices that can be used to make a sandwich if each sandwhich has the same filling?

17. Alisha has three roll of streamers to use in decorating the school gym for a dance competition. The red roll is 42 m long, yellow roll is 49 m long and the green roll is 63 m long. She wants to cut the roll into strips of equal length and have no material left over. What is the greatest length of each strip?

18. Aarushi is helping her father to plant trees to create a border around the backyard. Aarushi plants a tree in every 25 minutes and her father plants a tree in every 15 minutes. If they started together, how long will it be before they would finish planting a tree at the same time?

19. There are 28 students in section A, 36 students in section B and 32 students in section C of class VI in a school. What is the minimum number of books required for their class library, so that can be distributed equally among students any of the three sections equally.

20. For each of the following pairs of numbers, show that the product of their HCF and LCM equals their product:

(i) 14, 21 (ii) 27, 90

(iii) 117, 221

21. Find the greatest number which on dividing 1657 and 2037 leaves remainders 6 and 5 respectively.

22. A, B and C starts to run around a circular stadium at the same time, in the same direction. A completes a round in 252 seconds, B in 308 seconds and C in 198 seconds, all starting at the same point. After what time will they meet again at the starting point?

23. What is the value of $64 \div 8 \div 4 \div 2$?

24. Who am I?

(i) I am a 2-digit prime number, My tens digit is 5 and my ones digit is a prime number.

(ii) I am a 2-digit prime number. The total of my digits is a prime number greater than 13.

25. What least number should be subtracted from 26492518 so that the resulting number is divisible by 3, but not by 9?

26. Find the prime factors of 1729. Arrange the factors in ascending order. Find a relation between consecutive prime factors.

27. Find the HCF of the greatest two digit number and the smallest three digit number.

28. What is the HCF of $4 \times 27 \times 3125$, $8 \times 9 \times 25 \times 7$ and $16 \times 81 \times 5 \times 11 \times 49$?

29. Four bells toll after an interval of 8, 9, 12 and 15 seconds respectively. When will they toll again?

30. Find the greatest number of 4-digits exactly divisible by 12, 16, 24, 28 and 36.

ANSWER KEY

Very short answer type question

1. (i) Yes (ii) No

2. (i) Composite (ii) Prime (iii) Composite (iv) Composite (v) Prime

3. (i) 2 (ii) 97 (iii) 9 (iv) 71, 73 (v) 1

4. (i) 2 (ii) 2 (iii) 1

5. (i) 2 (ii) 1 (iii) 130 (iv) 2

6. 168

Short answer type question

7. 17

8. (i) 112 (ii) 26, 52, 78 (iii) 55, 60, 65, 70, 75

9. (i) Divisible (ii) Divisible (iii) Divisible (iv) Not divisible

10. (i) Divisible by both (ii) Divisible by 4 (iii) Not divisible by both
(iv) Divisible by both

11. (i) Divisible, Not divisible, Divisible
(ii) Not divisible, Divisible, Not divisible
(iii) Not divisible, Divisible, Not divisible

12. (i) 34 (ii) 12 (iii) 58

13. (i) 180 (ii) 180 (iii) 180

14. (i) 20 (ii) 17 (iii) 26 (iv) 3 (v) 8
(vi) 16 (vii) 3 (viii) 0

Long answer type question

15. (i) 300 (ii) 240 (iii) 216 (iv) 5940

16. 21 **17.** 7 **18.** 75 minutes

19. 2016 **21.** 127 **22.** 46 min 12 sec.

23. 1 **24.** (i) 53 (ii) 89

25. 4

26. 13 × 17 × 19, difference between at two consecutive prime numbers is even.

27. 1 **28.** 180 **29.** After 6 minutes **30.** 9072

Exercise-01 Solutions

Multiple choice questions

1. Option (4)

Factors are the numbers you multiply together to get another number.

Eg: $2 \times 3 = 6$

Factors

Here,

Number is 36.

Factors of 36 are

$36 = 1 \times 36$

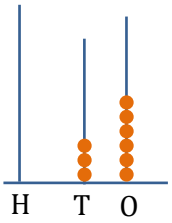
$= 1 \times 2 \times 18$

$= 1 \times 2 \times 2 \times 9$

$= 1 \times 2 \times 2 \times 3 \times 3$

i.e., 1, 2, 3, 4, 6, 9, 12, 18, 36

So, 9 is the correct answer.



2. Option (2)

1	?	3

11 and 13 are the factors of the number therefore we multiply them to get the number

$11 \times 13 =$ 13 × 11 = 13 + 130 = 143

So, the missing digit is 1$\boxed{4}$3 i.e., "4".

4 is the correct answer.

3. Option (3)

There is only one number which has exactly one factor i.e., 1 as $1 \times 1 = 1$.

1 is the correct answer.

4. Option (3)

Multiples are what we get after multiplying the number by an integer (not a fraction)

$\Rightarrow 4 \times 12 = 48$ (48 is a multiple of 4)

$\Rightarrow 12 \times 4 = 48$ (48 is a multiple of 12)

$\Rightarrow 18 \times 1 = 18$

$18 \times 2 = 36$

$18 \times 3 = 54$ (so; we can say 48 is not a multiple of 18)

$\Rightarrow$ $16 \times 3 = 48$ (48 is a multiple of 16)

$\therefore$ 18 is the correct answer.

5. **Option (4)**

Even numbers are multiple of 2.

95 is a 2-digit odd multiple of 5.

100 is a smallest 3-digit multiple of 5.

92 is not the multiple of 5.

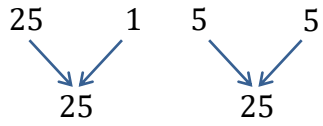
90 is the greatest 2-digit even multiple of 5.

$5 \times 18 = 90$

90 is the correct answer.

6. **Option (3)**

Factors of 25 are



$25 = 1 \times 25$

$25 = 5 \times 5$

Therefore, factors of 25 are 1, 5 and 25

$\therefore$ Sum of the factors of 25 are

$25 + 5 + 1 = 31$

31 is the correct answer.

7. **Option (3)**

Prime numbers are the numbers that has exactly two unique factors, 1 and the number itself.

"1" is neither prime nor composite number.

There are 25 primes between 1 and 100.

25 is the correct answer.

8. **Option (2)**

31, 23, 43 and 67 all are prime numbers

But the least prime number with consecutive digits.

$\therefore 23 < 31 < 43 < 67$

23 is the correct answer.

9. **Option (2)**

Co-prime numbers: Two numbers are said to be co-prime or relatively prime if they have only 1 as a common factor.

Eg. 2 and 3 are co-prime.

$20 = 5 \times 4$, $25 = 5 \times 5$ } not co-prime as "5" is another factor than "1" which is common in both.

$18 = 6 \times 3$, $35 = 7 \times 5$ } co-prime numbers

$15 = 5 \times 3$, $63 = 3 \times 21$ } not co-prime number as '3' is another common factor.

$27 = 3 \times 3 \times 3$, $81 = 3 \times 3 \times 3 \times 3$ } not co-prime numbers.

10. Option (3)

Twin primes are a prime number that differs from another prime number by two.

51, 53; 51 is not a prime number

$\therefore$ It is not a twin prime.

57, 59; 57 is not a prime number

$\therefore$ It is not a twin prime.

59, 61; yes, these are prime numbers and difference between them is two.

$\therefore$ It is a pair of twin primes.

11. Option (3)

Two numbers are "relatively prime" when they have no common factors other than 1.

In other words, you cannot evenly divide both by same common value.

I. 21, 32 are relatively prime as we cannot divide them evenly with/by some common value

$21 = 1 \times 3 \times 7$

$32 = 1 \times 2 \times 2 \times 2 \times 2$

1 is a common factor but for relatively prime numbers there should not be another common factor than 1.

So, they are relatively prime.

II. 30, 36

$30 = \textcircled{2} \times \textcircled{3} \times 5 \times 1$

$36 = \textcircled{2} \times 2 \times \textcircled{3} \times 3 \times 1$

30, 36 are not relatively prime as they have "2" and "3" common factors other than 1.

III. 49, 72

$49 = 1 \times 7 \times 7$; $72 = 2 \times 2 \times 2 \times 3 \times 3 \times 1$

49, 72 are relatively prime numbers as they have no common factor other than 1.

So, I and III are relatively prime number pairs

12. Option (4)

Divisibility rules:

Divisibility by 2 → A number is divisible by two if it has any of the digits 0, 2, 4, 6 or 8 in its ones place.

Divisibility by 4 → A number with 3 or more digits is divisible by 4 if the number formed by its last two digits (i.e. ones and tens) is divisible by 4.

Divisibility by 5 → A number which has either "0" or "5" in its ones place is divisible by 5.

Divisibility by 10 → A number is divisible by 10, if it has 0 in the ones place.

432650 is divisible by "2" as it contains "0" in its ones place.

432650 is not divisible by "4" as the number formed by its last two digits (50) is not divisible by 4.

432650 is divisible by "5" as it contains '0' in ones place.

432650 is divisible by "10" as it has "0" in ones place.

4 is the correct answer.

13. Option (3)

Let the number be "x". This number is divisible by both 5 and 8 that means 5 and 8 are the factors of the number.

So, it can be divisible by 5 × 8.

5 × 8 is the correct answer.

14. Option (3)

15938 * is divisible by 6,

divisibility rule for 6: A number is divisible by 6 if it is divisible by 2 and 3 both.

I. When unknown non-zero digit is 1 $\Rightarrow$ 159381
then it is divisible by 3 but not by 2.

II. When unknown non-zero digit is 2 $\Rightarrow$ 159382
then it is divisible by 2 but not by 3.

III. When unknown non-zero digit is 4 $\Rightarrow$ 159384
then it is divisible by both 2 and 3 and hence, it is the number which is divisible by 6.

IV. When unknown non-zero digit is 6 then it is divisible by 2 only not by 3.
4 is the correct answer.

15. Option (3)

(1) 185: is divisible by 5 only as its ones place has digit 5.

(2) 5875: is divisible by 5 only as its ones place has digit 5.

(3) 3540: it is divisible by 5 as its one's place digit is "0"
$\Rightarrow$ it is also divisible by 2 as its one's place digit is "0"
$\Rightarrow$ it is divisible by 3 as the sum of its digits is 12 which is divisible by 3.

(4) 709: it is not divisible by 5
$\Rightarrow$ it is not divisible by 2
$\Rightarrow$ it is not divisible by 3
Hence: 3540 is exactly divisible by 2, 3 and 5

Option (3) is the correct answer.

16. Option (2)

9 * 8071 is divisible by 11. If the difference between the sum of the digits at the odd places (from the right) and the sum of the digits at even places (from the right) is either "0" or divisible by 11.

$\Rightarrow 9 + 8 + 7 - (1 + 0 + *)$

$\Rightarrow 24 - (1 + *)$

$\Rightarrow$ (a) $24 - (1 + 4)$	(b) $24 - (1 + 1)$
$\Rightarrow 24 - 5 = 19$	$24 - 2 = 22$
not divisible by 11	divisible by 11
(c) $24 - (1 + 6)$	(d) $24 - (1 + 5)$
$\Rightarrow 24 - 7$	$24 - 6$
$\Rightarrow 14$	$\Rightarrow 18$
not divisible by 11	not divisible by 11

(2) is the correct answer.

17. Option (3)

7120 is not divisible by.....

* The last digit i.e., at ones place is zero "0" and so 7120 is divisible by "2"
* The last two digits i.e.; (one's and tens place) 20 is divisible by "4".
* The sum of the digits i.e., 7+1+2+0 = 10 which is not divisible by "3".

$\therefore$ 7120 is not divisible by "6".

* The number formed by the last three digits i.e. 120 is divisible by 8.

(3) is the correct answer.

18. Option (2)

Smallest 5-digit number = 10000

Prime factorization means to express a number as a product of its prime factors.

$= 10000 = 2 \times 5000$

$= 2 \times 5 \times 1000$

$= 2 \times 5 \times 2 \times 500$

$= 2 \times 5 \times 2 \times 5 \times 100$

$= 2 \times 5 \times 2 \times 5 \times 2 \times 50$

$= 2 \times 5 \times 2 \times 5 \times 2 \times 5 \times 2 \times 5$

$\therefore 10000 = 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5 \times 5$

(2) is the correct answer.

19. Option (2)

In prime factorisation, a number is expressed as a product of prime numbers only

(1) $24 = 2 \times 2 \times 6$ (6 is not a prime number)

(2) $76 = 2 \times 2 \times 19$ (19 is a prime number and 2 is also a prime number)

(3) $132 = 11 \times 3 \times 4$ (4 is not a prime number)

(4) $140 = 1 \times 2 \times 5 \times 7$ (1 is not a prime number) $\therefore 76 = 2 \times 2 \times 19$

(2) is the correct answer.

20. Option (2)

Consecutive numbers mean following one after another without interruption.

H.C.F. (highest common factor): The largest number which exactly divides the given two or more numbers is called the H.C.F.

So, let us take an example:

2 and 3

The H.C.F of 2 and 3 is

$2 = 2 \times (1)$

$3 = 3 \times (1)$ $\Rightarrow$ H.C.F. = 1

$\therefore$ H.C.F of two consecutive numbers is 1.

(2) is the correct answer.

21. Option (4)

Greatest common factor: The highest number that divides exactly into two or more numbers

Ist method:

$120 = 2 \times 2 \times 2 \times 3 \times 5$

$192 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3$

The factors of 120 are: 1, 2, 3, 5, 6, 8, 12, 15, 10, 20, (24), 30, 60, 120

The factors of 192 are 1, 2, 3, 6, 4, 8, 12, 16, (24), 32, 48, 96, 192

So, the highest or greatest common factor in both is 24.

But the method we used above is tedious and complicated. so, here is another method

Alternative method:

IInd method: Divide both the number by their common factors i.e.;

$\frac{120}{192} = \frac{60}{96}$

$$\frac{120}{192} \overset{\div 2}{\underset{\div 2}{=}} \frac{60}{96} \overset{\div 2}{\underset{\div 2}{=}} \frac{30}{48}$$

$$\Rightarrow \frac{30}{48} \overset{\div 2}{\underset{\div 2}{=}} \frac{15}{24} \overset{\div 3}{\underset{\div 3}{=}} \frac{5}{8}$$

[Now this cannot be further divided as there is no common factor of 5 and 8]

now multiply these common factors from which we have divided both the numbers i.e.;

$2 \times 2 \times 2 \times 3 = 8 \times 3 = 24$

(4) is the correct answer

22. Option (4)

(1) 60, 231

$60 = 2 \times 2 \times \textcircled{3} \times 5$

$231 = \textcircled{3} \times 7 \times 11$

$\Rightarrow$ H.C.F = 3 which is a prime number

(2) 15, 80

$15 = 3 \times \textcircled{5}$

$80 = 2 \times 2 \times 2 \times 2 \times \textcircled{5}$

$\Rightarrow$ H.C.F. = 5 which is a prime number

(3) 24, 26

$24 = \textcircled{2} \times 2 \times 2 \times 3$

$26 = \textcircled{2} \times 13$

$\Rightarrow$ H.C.F. = 2 which is a prime number

(4) 30, 42

$30 = \textcircled{2} \times \textcircled{3} \times 5$

$42 = \textcircled{2} \times \textcircled{3} \times 7$

$\Rightarrow$ H.C.F. = 6

which is not a prime number

So, option (4) is the correct answer

23. Option (3)

$5 + 7 \times 2 - 3 = 21$

(1) $5 + (7 \times 2) - 3 = 5 + 14 - 3$

$\Rightarrow 19 - 3 = 16$

(2) $5 + 7 \times (2 - 3) = 5 + 7 \times (-1) \Rightarrow 5 - 7 = -2$

(3) $(5 + 7) \times 2 - 3 = 12 \times 2 - 3 = 24 - 3 \Rightarrow 21$

(4) $5 + (7 \times 2 - 3)$

$= 5 + (14 - 3) = 5 + (11) = 16$

(3) is the correct answer

24. Option (3)

2 ? 6 – 12 ÷ 4 + 2 = 11

Lets place values of all the options one by one.

(1) "+"

L.H.S. 2 + 6 – 12 ÷ 4 + 2; that should be equals to "11"

According to "BODMAS" we solve this:

L.H.S. $2 + 6 - \frac{12}{4} + 2$

$\Rightarrow 2 + 6 - 3 + 2$

$\Rightarrow\ 8 - 3 + 2 \Rightarrow 8 + 2 - 3 \Rightarrow 10 - 3 = 7$

$7 \neq 11$ (R.H.S.)

So, "+" will not replace "?" in the given equation

(2) "–"

L.H.S. $2 - 6 - 12 \div 4 + 2$

$\Rightarrow 2 - 6 - \frac{12}{4} + 2$

$\Rightarrow 2 - 6 - 3 + 2 \Rightarrow 2 + 2 - 6 - 3$

$\Rightarrow 4 - 9 = -5 \neq 11$

L.H.S. ≠ R.H.S.

So, "–" will not replace "?" in the given equation

(3) "×"

$2 \times 6 - 12 \div 4 + 2 \Rightarrow$ i.e.; "x"

$\Rightarrow 2 \times 6 - \frac{12}{4} + 2 \Rightarrow 2 \times 6 - 3 + 2$

$\Rightarrow 12 - 3 + 2$

$\Rightarrow\ 14 - 3\ \Rightarrow 11 = 11$ (R.H.S.)

Hence, "x" will replace "?" in the given equation (3) is the correct answer.

25. Option (2)

According to BODMAS rule;

B – Brackets

O – of

D – Division

M – Multiplication

A – Addition

S – Subtraction

So, in $65 - (8 + 35 \div 5 \times 4)$

we will perform division first

(2) is the correct answer.

26. Option (2)

$24 \times 3 + (16 \div 8) - 12 \div 2 + 1$

First, we will simplify the expression in the brackets.

i.e., $16 \div 8$

(2) is the correct answer

27. Option (3)

To distribute equally the no. of pens and pencils among the student, we are required to find out the H.C.F i.e., (Highest common factor)

1001 Pens = $\textcircled{91} \times 11$

910 pencils = $\textcircled{91} \times 10$

so; 91 is the H.C.F.

i.e., 91 students will get 910 number of pencils and 1001 number of pens.

(3) is the correct answer.

28. Option (3)

Length = 16.58 m and breadth = 8.32m

For the greatest length, we will find out the H.C.F. of these.

$16.58 = \textcircled{2} \times 8.29$

$8.32 = 2 \times 4.16 = 2 \times 2.08 \times 2$

$= \textcircled{2} \times 2 \times 2 \times 1.04$

But we can see that "2" is the H.C.F.

Hence, the greatest length of the side of a square tile required for pairing the floor of the room is 2m.

(3) is the correct answer.

29. Option (2)

	I^{st} team	II^{nd} team	III^{rd} team
Students	512	430	489
	−8	−10	−9
	504	420	480

$\therefore 504 = \textcircled{2} \times \textcircled{2} \times \textcircled{2} \times 3 \times 7$

$420 = \textcircled{2} \times \textcircled{2} \times \textcircled{3} \times 5 \times 7$

$480 = \textcircled{2} \times \textcircled{2} \times 2 \times 2 \times 2 \times \textcircled{3} \times 5$

H.C.F of 504, 420 and 480 = $2 \times 2 \times 3 = 12$

(2) is the correct answer.

30. Option (2)

LCM means least common multiples of two or more numbers is the least of their common multiples. In three ways you can find the LCM of given numbers

(1) Listing multiples.

(2) Prime factorisation method

(3) Common division

Ist method: Listing multiples

9 = 9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99, 108, 117, (126)

14 = 14, 28, 42, 56, 70, 84, 98, 112, (126)

21 =21, 42, 63, 84, 105, (126)

The least common multiple of 9, 14 and 21 is 126,

IInd method: Prime factorisation method

9 = (3) × 3

14 = 2 × (7)

21 = (3) × (7)

Since, LCM is the product of the common factors and the factors which are not common to both the numbers.

$\therefore$ L.C.M. of 9, 14 and 21 is

$3 \times 7 \times 2 \times 3 \Rightarrow 2 \times 3 \times 3 \times 7 \Rightarrow 126$

IIIrd method: Common division method

2	9, 14, 21
3	9, 7, 21
3	3, 7, 7
7	1, 7, 7
	1, 1, 1

$\Rightarrow 2 \times 3 \times 3 \times 7 = 126$

31. Option (2)

77 = 7 × 11 (both 7, 11 are prime numbers and the only factors of 77 other than 1)

$\therefore$ x = 11, y = 7 (x > y)

$2y - x \Rightarrow 2(7) - 11 \Rightarrow 14 - 11 = 3$

(2) is the correct answer.

32. Option (2)

Buses leave the bus stop at 9.00 A.M.

Bus A returns every 30 minutes.

But B returns every 20 minutes.

Bus C returns every 45 minutes.

So, in order to calculate the next time, the buses will all return at the same time to the bus stop we find out the L.C.M. of the time (in minutes)

$\Rightarrow$ i.e, 30, 20 and 45

$\therefore$ L.C.M. of 30, 20 and 45 is

2	30, 20, 45
2	15, 10, 45
3	15, 5, 45
3	5, 5, 15
5	5, 5, 5
	1, 1, 1

$\Rightarrow 2 \times 2 \times 3 \times 3 \times 5$

$\Rightarrow$ 180 minutes

Now convert these minutes into hours so as to get the actual time.

i.e., 1 hour = 60 minutes

$\Rightarrow \frac{180}{60} = \frac{18}{6}$ = 3 hours

Therefore, the buses will all return at the same time after 3 hours i.e., 9 A.M. + 3 hours = 12 noon.

33. Option (2)

We know that the smallest 5-digit number is 10000.

But in order to search the least 5-digit no. which is exactly divisible by 16, 24, 36 and 54 we will take the L.C.M. of these.

2	16, 24, 36, 54
2	8, 12, 18, 27
2	4, 6, 9, 27
2	2, 3, 9, 27
3	1, 3, 9, 27
3	1, 1, 3, 9
3	1, 1, 1, 3
	1, 1, 1, 1

L.C.M. = $2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 = 432$

But we need the least

5-digit number which is a multiple of 432.

These are

$432 \times 10 = 4320$

432×20 = 4-digit

432×30 = 5-digit

$432 \times 21 = 9072$

$432 \times 22 = 9504$

$432 \times 23 = 4936$

$432 \times 24 = 10368$ ← least 5-digit number

10368 is the correct answer.

34. Option (4)

Greatest 5-digit number is 99999.

To find out the number divisible by 3,5,8 and 12 find out the LCM of all these numbers.

LCM = 2 × 2 × 2 × 3 × 5 = 120

Greatest five-digit number:

120 × 800 = 96000

120 × 810 = 98400

120 × 820 = 98400

120 × 830 = 99600 → 5 digits

120 × 840 = 100800 → 6 digits

Number exactly divisible by 120 is 99960 is 5-digit number.

number with remainder 2 = 99960 + 2 = 99962

35. Option (3)

If a and b are two numbers, then

a × b = HCF × LCM... (1)

Given: H.C.F = 11

LCM = 7700

and let a = 275 (one of the numbers)

∴ Let = b in the equation (1) and put all the given values in if

275 × b = 11 × 7700

⇒ b = 308

∴ Other number (b) is 308

(3) is the correct answer.

36. Option (2)

Since the LCM of co-prime numbers is equal to the product of co-primes.

and given that the product of two co-prime number is 117.

So, their LCM is also 117.

(2) is the correct answer.

37. Option (1)

Given: LCM = 4125, HCF = 25

and one number i.e., a = 375

formula: a × b = HCF × LCM

375 × b = 4125 × 25

$b = \frac{4125 \times 25}{375} = \frac{4125}{15}$

$b = \frac{825}{3} = 275$

Therefore, second number i.e., b = 275 and it is 100 less than the first number 375 – 275 = 100 is the correct answer.

38. Option (2)

$\frac{1219}{1431}$, we have to reduce it in simplest from so; divide numerator and denominator by their common factors.

As in $1219 = 23 \times (53)$

$1431 = 27 \times (53) \Rightarrow 3 \times 3 \times 3 \times 53$

So, $\frac{23\times53}{27\times53} = \frac{23}{27}$

53 is their H.C.F.

(2) is the correct answer.

39. Option (3)

Kim packed 6 baskets with identical fruits. Which means 6 is the H.C.F. (greatest)

Therefore,

We will calculate the H.C.F. of every fruit list given

(1) 24 oranges, 36 bananas, 10 pears

$24 = (2) \times 2 \times 2 \times 3$

$36 = (2) \times 2 \times 3 \times 3$

$10 = (2) \times 5$

H.C.F = 2

(2) 12 oranges, 30 bananas, 45 pears

$12 = 2 \times 2 \times (3)$

$30 = 2 \times (3) \times 5$

$45 = (3) \times 3 \times 5$

H.C.F = 3

(3) 42 oranges, 18 bananas, 72 pears

$42 = (2) \times (3) \times 7$

$18 = (2) \times (3) \times 3$

$72 = (2) \times 2 \times 2 \times (3) \times 3$

H.C.F. = $2 \times 3 = 6$

(4) 60 oranges, 54 bananas, 32 pears

$60 = (2) \times 2 \times 3 \times 5$

$54 = (2) \times 2 \times 3 \times 3$

$32 = (2) \times 2 \times 2 \times 2 \times 2$

H.C.F. = 2

Therefore, 42 oranges 18 bananas, 72 pears were in her fruit list.

40. **Option (2)**

Given numbers are:

24984, 26748 and 28584

number: 24984

Sum of its digits are 27 which is divisible by "3" The sum of the digits = 27 is a multiple of 9.

The last 3-digits i.e., 984 is divisible by 8 also

Hence, 24984 is divisible by 3, 8, and 9.

Number: 26748

The sum of the digits of this number = 27, so it is divisible by both 3 and 9.

but the last 3-digits i.e., 748 is not divisible by 8.

Hence, 26748 is divisible by 3 and 9 only

Number: 28584

The sum of the digits of the number is 27;

So, it is divisible by both 3 and 9

but the last 3-digits is 584 which is also divisible by 8

Hence, 28584 is divisible by 3 and 9

so, we conclude that the numbers

24984, 26748 and 28584 are divisible by 3 and 9 both but not all the numbers are divisible by 8.

(2) is the correct answer.

True and False

1. **False**

Factors of 6 are 1, 2, 3 and 6 so these are finite.

2. **False**

As the smallest natural number "1" has factor

$1 \times 1 = 1$

3. **False,**

$1 \times 3 = 3$ (Which is a prime number)

4. **False**

(2,3,5) is not the smallest prime triplet.

A set of three consecutive prime numbers differing by 2 is called a prime triplet.

(3, 5, 7) is only prime triplet.

5. **False**

Because 2 is an even prime number.

6. **True**

Ex. $1 \times 3 \times 5 = 15$ (odd no.)

7. **False**

1 is neither a prime number nor composite number.

8. **False**

Divisible by 3 → sum of the digits of the number are divisible by 3.

but divisible by 9 → sum of the digits of the number are the multiple of 9.

9. **True**

$3\,3\,2\,2\,1\,1 \Rightarrow (3 + 2 + 1) - (3 + 2 + 1) = 0$

So, it is divisible by 11.

10. **True**

E.g. LCM of 2 and 3 is 6 which is greater than either of the numbers.

11. **True**

As prime numbers will not be having any common factors in between them.

12. **False**

Ex. LCM of 6 and 12

$\left.\begin{matrix} 6 = 2 \times 3 \\ 12 = 2 \times 2 \times 3 \end{matrix}\right\}$ L.C.M. = 12

6 is a factor of 12; but LCM is not equals to 6.

13. **True**

Eg. HCF of 6 and 12

$\left.\begin{matrix} 6 = \textcircled{2} \times \textcircled{3} \\ 12 = \textcircled{2} \times 2 \times \textcircled{3} \end{matrix}\right\}$ HCF = 6

H.C.F. = 6 is a factor of their LCM = 12

14. **True**

Co-prime numbers are the numbers whose H.C.F. is 1.

So, two consecutive natural numbers are always Co-prime.

15. **True**

Multiples of 10 are

10, 20, 30, 40 .....

Let us take 10 and 20 and find their HCF

$\Rightarrow \left.\begin{matrix} \textcircled{2} \times \textcircled{5} \\ \textcircled{2} \times 2 \times \textcircled{5} \end{matrix}\right\}$ HCF = 10

Let us take

$\left.\begin{matrix} 30 = \textcircled{2} \times 3 \times \textcircled{5} \\ 40 = \textcircled{2} \times 2 \times 2 \times \textcircled{5} \end{matrix}\right\}$ HCF = 10

Fill in the blanks

1. 24 is the multiple of 3 and 8.

as $3 \times 8 = 24$ and $8 \times 3 = 24$

2. The least non-zero factor of any number is 1.

3. A number which has more than two factors is called composite number

4. Pair of primes i.e.; (3,5) and (5,7) etc. are called twin primes as they have a difference of two.

5. Sum of 3 odd numbers is always odd.

eg: 1+ 3 + 5 = 9 (odd)

6. A number is divisible by 4, if no-formed by the last two digits of the number is divisible by 4.

7. A number is divisible by 5, if its ones digit is 0 or 5.

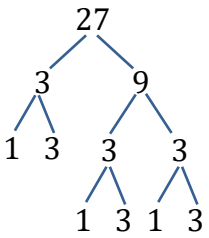
8. If a number is divisible by both 5 and 3, then it is necessarily divisible by 15.

9. 13, 31

37, 73

and 79, 97 are the primes less than 100

10. The factors of 27 are



i.e., 1, 3, 9, 27

Match the column

1. (1) → c ; (2) → d ; (3) → b ; (4) → a

Exercise-02 Solutions

1. When two or more numbers are multiplied, each number of the product is called a factor

(i) 13962

2	13962
3	6981
13	2327
179	179
	1

Factors are:

2, 3, 6, 39, 26, 179, ...

Yes; 39 is a factor of 13962

(ii) 85027

$$\begin{array}{r} 1977 \\ 43\overline{)85027} \\ -43 \\ \hline 420 \\ -387 \\ \hline 332 \\ -301 \\ \hline 317 \\ -301 \\ \hline 16 \end{array}$$

$\therefore$ Remainder is 16 if 43 would be the factor then remainder would be zero.

$\therefore$ 43 is not a factor of 85027.

2. Prime numbers are those which are divisible by 1 and itself, only composite numbers are those which are divisible by other numbers also except 1 and itself.

(i) 39

$\Rightarrow 39 = 3 \times 13$

it is a composite number which has two other factors i.e. 3 and 13 others than 1 and 39.

(ii) 43

$\Rightarrow 43 = 1 \times 43$

it is a prime number as it is divisible by 1 and itself only.

(iii) 58

$\Rightarrow 58 = 2 \times 29$

it is a composite number as 58 can be easily divisible by 2 and 29 also.

(iv) 87

$\Rightarrow 87 = 3 \times 29$

It is a composite number as it is divisible by 3 and 29 also.

(v) 97

$\Rightarrow 97 = 1 \times 97$

It is a prime number as it is divisible by 1 and itself.

3. (i) There is only one even prime number $\Rightarrow$ 2

(ii) Prime numbers between 90 and 100 is 97.

(iii) Smallest odd composite number $\Rightarrow 9 \Rightarrow 3 \times 3$

9 is an odd number and it has other factors i.e. 3 than 1 and itself, so it is a composite no.

(iv) Pair of twin primes between 70 and 80

$\Rightarrow$ Twin primes are the prime numbers that differs from another prime number by two (71,73)

71 and 73 as 73 –71 = 2

(v) 1 is the only number which is neither prime nor composite.

4. (i) Divisibility by 9: The sum of the digits is a multiple of 9.

78 * 964 may be divisible by 9.

sum of the remaining digits = 7 + 8 + 9 + 6 + 4 = 34

To make the number divisible by 9, the sum of the digits is a multiple of 9.

The smallest multiple of 9 after 27 is 36

$\therefore$ smallest number = 36 – 34 = 2

So, the number will be "2" in 782964

(ii) Divisibility by 4: A number with 3 or more digits is divisible by 4 if the number formed by its last two digits (i.e., ones and tens) is divisible by 4.

75 * may be divisible by 4

The smallest number that is required to make the last two digits divisible by 4 is the multiple of 4.

5* $\Rightarrow$ 52, which is the multiple of 4. So, the number is 752.

(iii) 2* 345 may be divisible by 3.

$\Rightarrow$ Divisibility rule for 3: The sum of the digits of the number is divisible by 3.

2+_ + 3 + 4 + 5 $\Rightarrow$ 14 + _

To make the number divisible by 3, the sum of its digits should be divisible by 3.

The smallest number which is the multiple of 3 that comes after 14 is 15.

$\therefore$ 15 – 14 = 1

Now, 2 + 1 + 3 + 4 + 5 = 15 is divisible by 3.

5. Prime factorisation method in which the number is expressed as a product of primes.

(i) 22, 34

$\Rightarrow$ $22 = \textcircled{2} \times 11$

$34 = \textcircled{2} \times 17$

$\therefore$ H.C.F. of (22,34) = 2

(ii) 6, 10, 11, 14

$\Rightarrow$ $6 = 2 \times 3$

$10 = 2 \times 5$

$11 = 11$

$14 = 2 \times 7$

$\therefore$ H.C.F. of 6, 10, 11 and 14 is 1.

(iii) 520, 1430

$\Rightarrow$ $520 = \textcircled{2} \times 2 \times 2 \times \textcircled{5} \times \textcircled{13}$

$1430 = \textcircled{2} \times \textcircled{5} \times 11 \times \textcircled{13}$

Their H.C.F. is = $2 \times 5 \times 13 = 130$

(iv) 54, 60, 72, 80

$54 = \textcircled{2} \times 3 \times 3 \times 3$

$60 = \textcircled{2} \times 2 \times 3 \times 5$

$72 = \textcircled{2} \times 2 \times 2 \times 3 \times 3$

$80 = \textcircled{2} \times 2 \times 2 \times 2 \times 5$

Their H.C.F. is 2.

6. The LCM of the 14, 21 24 and 42.

2	14,21,24,42
2	7,21,12,21
2	7,21,6,21
3	7,21,3,21
7	7,7,1,7
	1,1,1,1

LCM = $2 \times 2 \times 2 \times 3 \times 7 = 168$

As we need the least number which is exactly divisible by these numbers.

Therefore, the number is 168.

7. Prime numbers between 1 and 10 are: 2, 3, 5, 7

Their sum $\Rightarrow 2 + 3 + 5 + 7 = 17$

8. (i) Since even multiples of 7 will come when we multiply 7 with the even numbers only.

Therefore, $7 \times 2 = 14$, $7 \times 4 = 28$, $7 \times 6 = 42$, $7 \times 8 = 56$

$7 \times 10 = 70$, $7 \times 12 = 84$, $7 \times 14 = 98$, $7 \times 16 = 112$

So, the first 3-digit even multiple of 7 is 112.

(ii) Even multiples of 13 are

$13 \times 2 = 26$, $13 \times 4 = 52$, $13 \times 6 = 78$

(iii) Multiples of 5 between 52 and 76

$5 \times 11 = 55$, $5 \times 13 = 65$, $5 \times 15 = 75$

$5 \times 12 = 60$, $5 \times 14 = 70$

9. Divisibility rule for 11: A number is divisible by 11 if the difference between the sum of the digits at odd place (from the right) and the sum of the digits at even places (from the right) of the number is either "0" or divisible by "11"

(i) 61809

$(9 + 8 + 6) - (0 + 1) \Rightarrow 23 - 1 = 22$ is divisible by 11 Hence, 61809 is divisible by 11.

(ii) 70169803

$\Rightarrow (3 + 8 + 6 + 0) - (0 + 9 + 1 + 7)$

$\Rightarrow 17 - 17 = 0$

$\therefore$ 70169803 is divisible by 11.

(iii) 123574

$\Rightarrow (4+ 5 + 2) - (7 + 3 + 1) \Rightarrow 11 - 11 = 0$

$\therefore$ 123574 is divisible by 11.

(iv) 3178965

$\Rightarrow (3 + 7 + 9 + 5) - (1 + 8 + 6)$

$\Rightarrow 24 - 15 = 9$

9 is not divisible by 11.

$\therefore$ 3178965 is not divisible by 11.

10. Divisibility by 8 : A number with 4 or more digits is divisible by 8 if the number formed by its last three digits is divisible by 8.

Divisibility by 4 : A number with 3 or more digits is divisible by 4 if the number formed by its last two digits is divisible by 4.

(i) 6000

$\Rightarrow$ 00 is divisible by 4 as $\frac{00}{4} = 0$ so, 6000 is exactly divisible by 4.

$\Rightarrow$ 000 is divisible by 8 as $\frac{000}{8} = 0$. So, 6000 is exactly divisible by 8.

(ii) 84 is divisible by 4. So; 41084 is divisible by 4.

⇒ 084 is not divisible by 8. So; 41084 is not divisible by 8.

(iii) 3273

⇒ 73 is not divisible by 4. So; 3273 is not divisible by 4

273 is not divisible by 8. So; 3273 is not divisible by 8.

Hence; 3273 is not divisible by both 4 and 8.

(iv) 1704

⇒ 04 is divisible by 4. So; 1704 is divisible by 4.

⇒ 704 is divisible by 8. So; 1704 is also divisible by 8.

11. Divisibility by 25: if the number formed by the digits at the tens and unit place is divisible by 25.

(i) 6125, 50105 and 32950 by 25

⇒ 6125 is divisible by 25 as the number formed by the tens and unit place is 25.

50105 is not divisible by 25 as the number formed by the tens and unit place is 05.

32950 is divisible by 25 as the number formed by the tens and unit place is 50.

(ii) 17852, 639210, 61233 by 6

Divisibility rule for 6; The number should be divisible by both 2 and 3, then it will be divisible by 6.

17852 is divisible by 2; is not divisible by 3

Therefore, 17852 is not divisible by 6.

639210 : is divisible by 2 ; is divisible by 3

Therefore; 639210 is divisible 6.

61233: is not divisible by 2 ; is divisible by 3

Therefore; 61233 is not divisible by 6.

(iii) 3032, 2016, 3750 by 12

If the numbers are divisible by the factors of 12 ⇒ 3032 is divisible by 2; its one's digit is 2.

3032 is not divisible by 3; its sum of the digits is not divisible by 3.

Hence; 3032 is not divisible by 12

2016 is divisible by 2; its one's digit is 6.

2016 is also divisible by 3; its sum of the digits is divisible by 3.

Hence, 2016 is divisible by 12.

3750 is divisible by 2; its one's digit is 0.

3750 is divisible by 3; its sum of the digits is divisible by 3.

Hence, 3750 is divisible by 12.

12. (i) 2312, 3434

$$\begin{array}{r|l} 2312\overline{)3434} & 1 \\ -2312 & \\ \hline 1122\overline{)2312} & 2 \\ -2244 & \\ \hline 68\overline{)1122} & 16 \\ -1088 & \\ \hline 34\overline{)68} & 2 \\ -68 & \\ \hline 0 & \end{array}$$

Hence, 34 is the last divisor and this is the HCF of 2312 and 3434.

HCF = 34

(ii) 144, 180, 192

Step -I

Choose any two numbers

Let 144 and 180

$$\begin{array}{r|l} 144\overline{)180} & 1 \\ -144 & \\ \hline 36\overline{)144} & 4 \\ -144 & \\ \hline 0 & \end{array}$$

Step -II

Now divide the remaining number by the last divisor of Step I

$$\begin{array}{r|l} 36\overline{)192} & 5 \\ -180 & \\ \hline 12\overline{)36} & 3 \\ -36 & \\ \hline 0 & \end{array}$$

∴ last divisor in step – II is 12.

So, HCF = 12

(iii) 1624, 522, 1276

$$\begin{array}{r|l} 522\overline{)1624} & 3 \\ -1566 & \\ \hline 58\overline{)522} & 9 \\ -522 & \\ \hline 0 & \end{array}$$

Now divide 1276 by 58.

$$\begin{array}{r|l} 58\overline{)1276} & 22 \\ -1276 & \\ \hline 0 & \end{array}$$

13. (i) 10, 12, 18

2 | 10
5 | 5
1

2 | 12
2 | 6
3 | 3
1

2 | 18
3 | 9
3 | 3
1

$10 = 2 \times 5$

$12 = 2 \times 3 \times 2$

$18 = 2 \times 3 \times 3$

LCM (10, 12, 18) $= 2 \times 5 \times 3 \times 3 \times 2 = 90 \times 2 = 180$

(ii) 18, 20, 30

2 | 18
3 | 9
3 | 3
1

2 | 20
2 | 10
5 | 5
1

2 | 30
3 | 15
5 | 5
1

$18 = 2 \times 3 \times 3$

$20 = 2 \times 2 \times 5$

$30 = 2 \times 3 \times 5$

$\Rightarrow$ L.C.M. (18, 20, 30) $= 2 \times 3 \times 5 \times 3 \times 2 = 180$

(iii) 9, 15, 18, 20

3 | 9
3 | 3
1

3 | 15
5 | 5
1

2 | 18
3 | 9
3 | 3
1

2 | 20
2 | 10
5 | 5
1

$9 = 3 \times 3$

$15 = 3 \times 5$

$18 = 3 \times 3 \times 2$

$20 = 5 \times 2 \times 2$

L.C.M. (9, 15, 18, 20) $= 3 \times 3 \times 5 \times 2 \times 2 = 180$

14. B – brackets

O – of

D – division

M – multiplication

A – addition

S – subtraction

(i) $(39 \div 3) + 7$

$\Rightarrow \left(\frac{39}{3}\right) + 7 \Rightarrow (13) + 7 = 20$

(ii) $15 + 4 \div (5 - 3)$

$\Rightarrow 15 + 4 \div (2) \Rightarrow 15 + \frac{4}{2}$

$\Rightarrow 15 + 2 = 17$

(iii) $17 + (3 \times 5) - 6$

$= 17 + (3 \times 5) - 6$

$= 17 + 15 - 6$

$= 32 - 6 = 26$

(iv) $63 - \{(24 - 20) \times 15\}$

$= 63 - \{(4) \times 15\}$

$= 63 - \{4 \times 15\}$

$= 63 - 60$

$= 3$

(v) $8 - \{4\ (10 - 8) - 16 \div 2\}$

$= 8 - \{4(2) - 16 \div 2\}$

$= 8 - \{4\times 2 - 16 \div 2\}$

$= 8 - \{4 \times 2 - 8\}$

$= 8 - \{8 - 8\} \Rightarrow 8 - \{0\} \Rightarrow 8 - 0 = 8$

(vi) $(17 - 9) \times \{18 \div (4 + 5)\}$

$= (8) \times \{18 \div (9)\} \Rightarrow 8 \times \{18 \div 9\}$

$\Rightarrow \quad 8 \times \left\{\frac{18}{9}\right\} \Rightarrow 8 \times 2 = 16$

(vii) $27 \div \{8 + (20 \div 5 - 3)\}$

$= 27 \div \left\{8 + \left(\frac{20}{5} - 3\right)\right\}$

$= 27 \div \{8 + (4 - 3)\} \Rightarrow 27 \div \{8 + 1\}$

$= 27 \div 9 = 3$

(viii) 73 of $[45 - \{6 \times 7 + (23 - 4$ of $5)\}]$

$= 73$ of $[45 - \{6 \times 7 + (23 - 4 \times 5)\}]$

$= 73$ of $[45 - \{6 \times 7 + (23 - 20)\}]$

$= 73$ of $[45 - \{6 \times 7 + 3\}]$

$= 73$ of $[45 - \{42 + 3\}] \Rightarrow 73$ of $[45 - 45]$

$= 73$ of $[0] \Rightarrow 73 \times 0 = 0$

15. (i) 20, 25, 30, 50

2	20, 25, 30, 50
2	10, 25, 15, 25
3	5, 25, 15, 25
5	5, 25, 5, 25
5	1, 5, 1, 5
	1, 1, 1, 1

L.C.M. = 2 × 2 × 3 × 5 × 5

= 300

(ii) 8, 12, 20, 30, 80

2	8, 12, 20, 30, 80
2	4, 6, 10, 15, 40
2	2, 3, 5, 15, 20
2	1, 3, 5, 15, 10
3	1, 3, 5, 15, 5
5	1, 1, 5, 5, 5
	1, 1, 1, 1,1

L.C.M. = 2 × 2 × 2 × 2 × 3 × 5 = 240

(iii) 9, 12, 18, 24, 27

2	9, 12, 18, 24, 27
2	9, 6, 9, 12, 27
2	9, 3, 9, 6, 27
3	9, 3, 9, 3, 27
3	3, 1, 3, 1, 9
3	1, 1, 1, 1, 3
	1, 1, 1, 1, 1

L.C.M = 2 × 2 × 2 × 3 × 3 × 3 = 216

(iv) 22, 54, 108, 135, 198

2	22, 54, 108, 135, 198
2	11, 27, 54, 135, 99
3	11, 27, 27, 135, 99
3	11, 9, 9, 45, 33
3	11, 3, 3, 15, 11
5	11, 1, 1, 5, 11
11	11, 1, 1, 1,11
	1, 1, 1, 1,1

L.C.M. = 2 × 2 × 3 × 3 × 3 × 5 × 11

= 108 × 55

= 5940

16. Jai and Reena are making sandwiches which have 63 tomato slices, 84 cheese slices and 126 cucumber slices

$\therefore$ For greatest number of sundwhiches with the same filling in each is $\Rightarrow$ HCF of 63, 84 and 126.

$63 = 3 \times \textcircled{3} \times \textcircled{7}$
$84 = 2 \times 2 \times \textcircled{3} \times \textcircled{7}$
$126 = 2 \times 3 \times \textcircled{3} \times \textcircled{7}$

$\therefore$ HCF = 21

Hence, they can make 21 sandwiches with each has the same filling.

17. Red roll is 42m long, yellow roll is 49m long and the green roll is 63m long.

$\therefore$ Greatest length of each strip $\Rightarrow$ HCF of 42, 49, 63

$42 = 2 \times 3 \times \textcircled{7}$
$49 = 7 \times \textcircled{7}$
$63 = 3 \times 3 \times \textcircled{7}$

H.C.F. = 7

Hence, the greatest length of each strip = 7

18. Aarushi plants a tree every 25 minutes and her father plants a tree every 15 minutes. They will finish planting a tree at the same time is the LCM of 25 and 15.

3	15, 25
5	5, 25
5	1, 5
	1, 1

LCM = 5 × 5 × 3

= 25 × 3 =75

i.e., 75 minutes

19. Section A = 28 students

Section B = 36 students

Section C = 32 students

We will take the LCM of 28, 36 and 32 for distributing books equally among the students

2	36, 28, 32
2	18, 14, 16
2	9, 7, 8
2	9, 7, 4
2	9, 7, 2
3	9, 7, 1
3	3, 7, 1
7	1, 7, 1
	1, 1, 1

i.e., LCM = 2 × 2 × 2 × 2 × 2 × 3 × 3 × 7 = 2016

20. (i) 14, 21

$14 = 2 \times 7$;

$21 = 3 \times 7$; LCM $= 7 \times 6 = 42$; HCF $= 7$

$\therefore$ $a \times b = HCF \times LCM$

$\Rightarrow$ $14 \times 21 = 7 \times 42$

$294 = 294$

Hence proved.

(ii) 27, 90

$27 = 3 \times 3 \times 3$, $90 = 2 \times 3 \times 3 \times 5$

HCF $= 9$, LCM $= 3 \times 3 \times 3 \times 2 \times 5 = 270$

$\therefore$ $a \times b = HCF \times LCM$

$27 \times 90 = 9 \times 270$

$2430 = 2430$

Hence proved.

(iii) 117, 221

$117 = 13 \times 3 \times 3$

$221 = 13 \times 17$

HCF $= 13$; LCM $= 13 \times 3 \times 3 \times 17 = 1989$

$a \times b = HCF \times LCM$

$117 \times 221 = 13 \times 1989$

$25857 = 25857$

Hence proved

21. As the word greatest is used, we have to find the HCF that divides 1657 leaving a remainder 6 and 2037 leaving a remainder 5.

$\Rightarrow 1657 - 6 \Rightarrow 1651$

$2037 - 5 \Rightarrow 2032$

So, we take H.C.F. of these number i.e., 1651 and 2032.

$\Rightarrow$ $1651 = 13 \times 127$

$2032 = 1016 \times 2 = 2 \times 2 \times 508$

$= 2 \times 2 \times 2 \times 254$

$= 2 \times 2 \times 2 \times 2 \times 127$

$\therefore$ HCF $= 127$ is the greatest number

22. A completes in 252 seconds

B completes in 308 seconds.

C completes in 198 seconds

$\therefore$ Time at which they meet again at the starting point will be the LCM of (252, 308, 198) seconds

2	252, 308, 198
2	126, 154, 99
3	63, 77, 99
3	21, 77, 33
7	7, 77, 11
11	1, 11, 11
	1, 1, 1

L.C.M. $\Rightarrow 2 \times 2 \times 3 \times 3 \times 7 \times 11$

$\Rightarrow 4 \times 9 \times 77$

$\Rightarrow 36 \times 77 = 2772$ sec

To convert it into minute

divide it by 60 [1 min = 60 sec]

$\Rightarrow \frac{2772}{60} = 46\frac{12}{60} \Rightarrow$ 46min 12 seconds

23. $64 \div 8 \div 4 \div 2$

Start division from right always if there comes only division in the expression.

$64 \div 8 \div \frac{4}{2}$

$64 \div 8 \div 2$

$64 \div \frac{8}{2} \Rightarrow 64 \div 4 \Rightarrow 16$

24. (i) Prime number from 1 to 10 are 2, 3, 5, 7

$\Rightarrow \underset{\downarrow}{\overset{5}{}}\ \underset{\downarrow}{\overset{3}{}}$

T O

ten's digit is 5 given, we have to search for ones digit so that it will become a prime number.

So, one's digit is 3.

(ii) 2-digit prime no. greater than 13

i.e.; 17 will be the total of a 2-digit prime number.

i.e.; 9 + 8 = 17, 98 is a composite number

8 + 9 = 17, but 89 is not a composite number.

So; 89 is a 2-digit prime number.

25. Divisible by 3 $\rightarrow$ sum of the digits of a number is divisible by 3.

Divisible by 9 $\rightarrow$ Sum of the digits is a multiple of 9, then it is divisible by 9.

$\therefore 2 + 6 + 4 + 9 + 2 + 5 + 1 + 8$

[adding the digits of the number 26492518]

$\Rightarrow$ 37; if we subtract 1 from it then it will be divisible by both 3 and 9.

but if we subtract 4 from it then it will be divisible by 3 only.

$\therefore 37 - 4 = 33$ divisible by 3 only.

26.

7	1729
13	247
19	19
	1

∴ prime factors of 1729 ⇒ 7 × 13 × 19

Relation between these consecutive prime factors is

19 – 13 = 6

13 – 7 = 6 i.e., they are at a difference of 6.

27. Greatest two-digit number = 99

smallest three-digit odd number = 100

∴ H.C.F. of 99 and 100 is

99 = 3 × 3 × 11

101 = 101 × 1

∴ HCF = 1

28. 4 × 27 × 3125, 8 × 9 × 25 × 7,

16 × 81 × 5 × 11 × 49.

H.C.F. of above three numbers

(1) 2 × 2 × 3 × 3 × 3 × 5 × 5 × 5 × 5 × 5

(2) 2 × 2 × 2 × 3 × 3 × 5 × 5 × 7

(3) 2 × 2 × 2 × 2 × 3 × 3 × 3 × 3 × 5 × 7 × 7 × 11

HCF = 2 × 2 × 3 × 3 × 5

H.C.F. = 4 × 9 × 5

H.C.F. = 36 × 5 = 180

29. Intervals are 8, 9, 12 and 15 seconds on taking LCM of 8, 9, 12 and 15, we will get to know at which at which time all the bells toll again.

2	8, 9, 12, 15
2	4, 9, 6, 15
2	2, 9, 3, 15
3	1, 9, 3, 15
3	1, 3, 1, 5
5	1, 1, 1, 5
	1, 1, 1, 1

L.C.M. = 2 × 2 × 2 × 3 × 3 × 5

= 360 seconds

1 min = 60 sec

6 min = 360 seconds

30.

$12 = 2 \times 2 \times 3$
$16 = 2 \times 2 \times 2 \times 2$
$24 = 2 \times 2 \times 2 \times 3$
$28 = 2 \times 2 \times 7$
$36 = 2 \times 2 \times 3 \times 3$

L.C.M. = $2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 7$

L.C.M. = 1008

Now greatest 4-digit number is 9999.

$$1008\overline{)9999}\,9$$
$$-9072$$
$$0927$$

$\therefore$ The greatest 4-digit number is $1008 \times 9 = 9072$