SOLUTIONS

1. (b) $15 = 3 \times 5$
$24 = 3 \times 2^3$
$35 = 5 \times 7$
$54 = 2 \times 3^3$
LCM (15, 24, 35, 54)
$= 2^3 \times 3^3 \times 5 \times 7$
$= 7560$

2. (d) A : B = 3 : 4
Let, the number be $3x$ and $4x$
ATQ,
$3x \times 4x = \text{HCF} \times \text{LCM}$
$\Rightarrow 12x^2 = 2700$
$\Rightarrow x^2 = 9 \times 25$
$\Rightarrow x = 15$
$\therefore$ Difference $= x = 15$

3. (c) $A \times B = 726$
HCF = 11
$$\text{LCM} = \frac{A \times B}{\text{HCF}}$$
then, $\text{LCM} = \frac{726}{11} = 66$

4. (b) Let, the number are $5x$ and $7x$
ATQ,
$5x \times 7x = 5 \times 175$
$x^2 = 25$
$x = 5$
$\therefore$ Larger number $= 7 \times 5$
$= 35$

5. (c) $\text{LCM}\left(\frac{3}{2}, \frac{81}{16}, \frac{9}{8}\right)$
$$= \frac{\text{LCM}(3, 81, 9)}{\text{HCF}(2, 16, 8)} = \frac{81}{2}$$

6. (c) $\text{LCM}\left(\frac{1}{3}, \frac{3}{5}, \frac{4}{7}, \frac{9}{16}\right)$
$$= \frac{\text{LCM}(1, 3, 4, 9)}{\text{HCF}(3, 5, 7, 16)} = \frac{36}{1} = 36$$

7. (d) $210 = 2 \times 3 \times 5 \times 7$
$336 = 2^4 \times 3 \times 7$
$504 = 2^3 \times 3^2 \times 7$
LCM (210, 336, 504)
$\Rightarrow \text{LCM} = 2^4 \times 3^2 \times 5 \times 7$
$= 5040$

8. (d) HCF (6, 5.25, 12.50)
$$\text{HCF}\left(\frac{600}{100}, \frac{525}{100}, \frac{1250}{100}\right)$$
$$\Rightarrow \frac{\text{HCF}(600, 525, 1250)}{\text{LCM}(100, 100, 100)}$$
$600 = 25 \times 24$
$525 = 25 \times 21$
$1250 = 25 \times 50$
$$\therefore \text{HCF} = \frac{25}{100} = 0.25$$

9. (d) HCF (12, 18, 42) = 6

10. (a) LCM $(x, y) = 533$
since, HCF $(x, y) = 1$
$x \times y = 533 = 13 \times 41$
$\therefore x = 41, y = 13$
$\Rightarrow 4y - x = 13 \times 4 - 41$
$= 52 - 41$
$= 11$

11. (c) $\text{I} \times \text{II} = \text{HCF} \times \text{LCM} = 20000$
$$\text{HCF} = \frac{20000}{800} = 25$$

12. (c) HCF (m, n) = a
n = ab
Let, m = ac
LCM = (m, n) = (ab, ac)
= abc = (ac)b = bm

13. (c) Let, the numbers are $12x$ & $7x$
HCF $= x = 25$
$\therefore$ Number are $= 12 \times 25 = 300$
$7 \times 25 = 175$

14. (d) LCM = 1105, HCF = 5
Also, $1105 = 17A \Rightarrow A = 65$
$1105 \times 5 = 65 \times B$
$$\therefore B = \frac{1105 \times 5}{65} = 85$$
Hence, Numbers are 65 and 85

15. (a) $240 = 2^4 \times 3 \times 5$
$280 = 2^3 \times 5 \times 7$
$560 = 2^4 \times 5 \times 7$
HCF (240, 280, 560)
$\therefore \text{HCF} = 2^3 \times 5 = 40$

16. (b) $96 = 2^5 \times 3$
$108 = 2^2 \times 3^3$
$144 = 2^4 \times 3^2$
LCM (96, 108, 144) = 864
$\therefore$ Required number $= (2^5 \times 3^3)$
$= 32 \times 27 = 864$

17. (a) HCF (3888, 3969)
$3888 = 2^4 \times 3^5$
$3969 = 3^4 \times 7^2$
$\therefore \text{HCF} = 3^4 = 81$

18. (a)HCF (20, 30, 40) = 10
total number of such bars
$$= \frac{20}{10} + \frac{30}{10} + \frac{40}{10}$$
$= 2 + 3 + 4 = 9$

19. (d) LCM = (660), HCF = 5
$A \times B = \text{HCF} \times \text{LCM}$
$55 \times B = 5 \times 660$
$B = 60$

20. (d) Let, the numbers are $13x$ and $15x$
HCF $= x = 12$
$\therefore \text{LCM} = 13 \times 15 \times x = 13 \times 15 \times 12$
$= 2340$

21. (d) LCM (12, 18, 27)
$12 = 3 \times 2^2$
$18 = 2 \times 3^2$
$27 = 3^3$
$\therefore \text{LCM} = 2^2 \times 3^3$
$= 4 \times 27 = 108$

22. (d) $78 = 2 \times 3 \times 13$
$84 = 2 \times 2 \times 3 \times 7$
$90 = 2 \times 3 \times 3 \times 5$
$112 = 2 \times 2 \times 2 \times 2 \times 7$
HCF (78, 84, 90, 112) = 2

23. (c) LCM (20, 28, 34, 60, 75)
$= 2^2 \times 5 \times 7 \times 17 \times 3 \times 5$
$= 35700$

24. (b) LCM (73, 657) = 657
$[657 = 73 \times 9]$

25. (a) HCF $[(x^6 + 1), (x^4 - 1)]$
$x^6 + 1 = (x^2 + 1)\,[x^4 + 1 - x^2]$
$x^4 - 1 = (x^2 - 1)\,(x^2 + 1)$
$\therefore \text{HCF} = (x^2 + 1)$

26. (a) Let, the numbers are $5x$, $7x$ & $9x$
LCM = 34650
$5 \times 7 \times 9 \times x = 34650$
$x = 110$
$\therefore$ HCF = 110

27. (a) By difference method-
1036, 1813, 3885
777 2072
1295
5×259
$\therefore$ HCF = 259

28. (d) Consider,
HCF (315, 500, 685)
$315 = 3^2 \times 5 \times 7$
$500 = 2^2 \times 5^3$
$685 = 5 \times 137$
$\therefore$ HCF = 5 cm

29. (c) LCM (96, 132, 438)
$96 = 2^5 \times 3$
$132 = 2^2 \times 3 \times 11$
$438 = 2 \times 3 \times 73$
$\Rightarrow$ LCM = $2^5 \times 3 \times 11 \times 73$
= 77088

30. (b) LCM $(x^2 - 8x + 15, x^2 - 5x + 6)$ = ?
$x^2 - 8x + 15 = x^2 - 3x - 5x + 15$
$= x(x-3) - 5(x-3)$
$= (x-5)(x-3)$
$x^2 - 5x + 6 = x^2 - 3x - 2x + 6$
$x(x-3) - 2(x-3)$
$= (x-2)(x-3)$
$\therefore$ LCM = $(x-3)(x-2)(x-5)$

31. (b) 0.15, 0.18 and 0.45

$$\text{LCM}\left(\frac{15}{100}, \frac{18}{100}, \frac{45}{100}\right)$$

$$\Rightarrow \text{LCM} = \frac{3\times5\times2\times3}{100}$$

$$= \frac{90}{100} = 0.9$$

32. (d) LCM (20, 30, 45, 65)
$= 2^2 \times 5 \times 3 \times 3 \times 13$
= 2340

33. (d) $125 = 5^3$
$250 = 5^3 \times 2$
$750 = 2 \times 3 \times 5^3$
HCF (125, 250, 750)
$\therefore$ HCF = 5^3 = 125

34. (a) ATQ,
LCM = 5 (HCF) ......(i)
A × B = 20480 = LCM × HCF
$20480 = 5 \times (\text{HCF})^2$
$4096 = \text{HCF}^2$
$\therefore$ HCF = 64
$\therefore$ LCM = 5 × 64 = 320

35. (b) A + B = 60 ....(i)
HCF = 5
LCM = 60
$\therefore$ A × B = 5 × 60 = 300 ....(ii)
From equation (i) and (ii)

$$\therefore \frac{1}{A} + \frac{1}{B} = \frac{B+A}{AB} = \frac{60}{300} = \frac{1}{5}$$

36. (a) Let, the numbers are $2x$ & $7x$
HCF = 9, LCM = 126
ATQ,
$2x \times 7x = 9 \times 126$
$x = 9$
$\therefore$ Large number = 9 × 7 = 63

37. (b) LCM (8, 12, 18)
$\Rightarrow 8 \times 3^2 = 72$

38. (c) Since 36 and 17 are co-prime numbers
$\therefore$ LCM (17, 36) = 36 × 17 = 612
Largest number of four digits = 9999
and 9999 = 612 × 16 + 207
$\therefore$ Required number is 9999 – 207 = 9792

39. (c) Consider,
HCF (261 – 5, 853 – 5, 1221 – 5)
= HCF (256, 848, 1216)
$256 = 2^8$
$848 = 2^4 \times 53$
$1216 = 2^6 \times 19$
$\therefore$ HCF (256, 848, 1216) = 2^4 = 16

40. (d) Consider,
LCM (2, 4, 6, 8) = 24
1351 = 24 × 57 – 17
$\therefore$ Required number that should be added to 1351 to make it exactly divisible by 24 is '17'.

41. (b) HCF (45, 55) = 5
ATQ,
5 = 55 × 5 + 45m
5 = 275 + 45m
45m = – 270
$\therefore$ m = – 6

42. (b) Consider,
LCM(4, 9, 12, 15) = 180
$\therefore$ Least such number is 183.

43. (a) Consider,
LCM (4, 6, 9, 12, 15) = 180
$\therefore$ 180 × 5 = 900 is smallest perfect square number

44. (d) HCF (6, 8, 9) = 1
LCM (6, 8, 9) = 72
$\therefore$ Required number is of the form:-
72k + 1
from given options:-
for k = 6
$\Rightarrow$ 72 × 6 + 1 = 433

45. (d) Consider,
LCM (12, 14, 16, 18) = 1008

$$\therefore \text{required number} = \frac{1008}{2} = 504$$

46. (b) Consider,
LCM (15, 25, 40, 75) = 600
$\therefore$ greatest such 4 digit number is:-
(from options, a multiple of 600)
= 9600

47. (b) Consider,
LCM (9, 12, 15, 25, 27) = 675 × 4 = 2700
Least number of 5 digit = 10000
also, 10000 = 2700 × 4 – 800
$\therefore$ required number = 10800

48. (d) LCM of 15 and 18 = 90
Required Number = 90 + 3 = 93

49. (c) LCM of numbers
= HCF × [product of ratio]
= 3 × 4 × 5 = 60

50. (a) Given that, LCM of a and b is = 42
Hence LCM of 11a and 5b
= 11 × 5 × (LCM of a and b)
= 55 × 42 = 2310

51. (a) Let the two numbers be Ha and Hb and their HCF is H.
Given, sum of Numbers = 1224 and HCF = 68
Therefore, Ha + Hb = 1224
$\Rightarrow$ H(a + b) = 1224

$$\Rightarrow a + b = \frac{1224}{68}$$

$\Rightarrow$ a + b = 18
Now, Assume the such value of a and b whose sum is 18 and HCF is 1.
a = 1 and b = 17
a = 5 and b = 13
a = 7 and b = 11
There are 3 pairs.

52. (a) LCM of numbers = HCF × [product of ratio]
$\Rightarrow$ 336 = HCF × [1 × 3 × 7]

$$\Rightarrow \text{HCF} = \frac{336}{21}$$

$\Rightarrow$ HCF = 16

53. (c) Prime Factorization of 960
$= 2^6 \times 3 \times 5$
Prime Factorization of 1020
$= 2^2 \times 3 \times 5 \times 17$
HCF = $2^2 \times 3 \times 5$ = 60

54. (d) We know,
Product of numbers = LCM × HCF
$\Rightarrow x \times y = 441 \times 7$
$\Rightarrow 49 \times y = 3087$

$$\Rightarrow y = \frac{3087}{49}$$

$\Rightarrow$ y = 63

55. (b) Smallest number which is divisible by 12, 16 and 24
= LCM (12, 16 and 24) = 48
When we divide 550 by 48 we get quotient = 11 remainder = 22
Thus, The first number greater than 550 which is divisible by 48
= 550 + (48 – remainder)
= 550 + 26 = 576
Hence, the number which are divisible by 48 and leave remainder 5,
1st number = 576 + 5 = 581
2nd number = 576 + 48 = 624 + 5 = 629
3rd number = (576 + 48) + 48 = 672 + 5 = 677
Sum = 581 + 629 + 677 = 1887

56. (a) LCM of 15, 24 and 40 = 120
Largest 4 digit number = 9999
On dividing 9999 by 120, We get quotient = 83 and remainder = 39
Hence, Required number
= 9999 – 39
= 9960

SMART APPROACH:-
You can direct check which larger option is completely divisible by 120

57. (c) HCF of the 24, 56 and 96 = 8

58. (c) Factor of 238 = 2 × 7 × 17
Factor of 832 = 2 × 2 × 2 × 2 × 2 × 2 × 13
Therefore, HCF = 2

59. (a) We know that,
First no. × second no = LCM × HCF
$\Rightarrow$ 18 × second no = 126 × 9
$\Rightarrow$ Second no = $\frac{126 \times 9}{18}$
$\Rightarrow$ Second no = 63

60. (b) LCM of 48 and 64 = 192
HCF of 12 and 18 = 6
ATQ,
LCM of 48 and 64 = m × HCF of 12 and 18
$\Rightarrow$ 192 = m × 6
$\Rightarrow$ m = $\frac{192}{6}$
$\Rightarrow$ m = 32

61. (d) 108 = 72 × 1 + 36
72 = 36 × 2 + 0
Hence, 5a = 5 × 36 = 180
Now,
108 = 2 × 2 × 3 × 3 × 3
72 = 2 × 2 × 2 × 3 × 3
36 = 2 × 2 × 3 × 3
LCM = 2 × 2 × 2 × 3 × 3 × 3
= 216

62. (d) 554 – 43 = 511
714 – 57 = 657
213 – 67 = 146
Now,
Prime Factorisation of
511 = 7 × 73
657 = 3 × 3 × 73
146 = 2 × 73
Hence, HCF = 73
Therefore, The greatest positive integer that divides 554, 714 and 213 and leaves the remainder 43, 57, and 67 respectively is 73.

63. (b) Factor of 25 = 5 × 5
Factor of 30 = 2 × 3 × 5
Factor of 50 = 2 × 5 × 5
Factor of 75 = 3 × 5 × 5
LCM = 5 × 5 × 3 × 2 = 150

64. (a) Factor of 364 = 2 × 2 × 7 × 13
Factor of 724 = 2 × 2 × 181
HCF = 4

65. (b) LCM of 13, 15, 18 & 21 = 8190
Greatest 5 digit number = 99999
When we divide 99999 by 8190, we get,
quotient = 12 and remainder = 1719
Required number = 99999 – 1719 = 98280

SMART APPROACH:-
We can direct result by divisibilty 5 and 9 together only option (b) is correct.

66. (c) 15 = 3 × 5
30 = 2 × 3 × 5
40 = 2 × 2 × 2 × 5
HCF = 5

67. (b) LCM of 16, 24, 72 & 84 = 1008
When we divide largest 6 digit number – 999999 by 1008 we get–
remainder = 63
Largest 6 digit number which is divisible by 1008
= 999999 – 63
= 999936
Hence, Required Number
= 999936 + 15 = 999951

SMART APPROACH:-
We can direct result by divisibility 4, 8 and 9
∴ 999951 – 15 = 999936
Only option (b) is correct.

68. (b) LCM = HCF × product of ratios
= 3 × 5 × 7
= 105

69. (b) HCF of fraction
$= \frac{\text{HCF of Numerator}}{\text{LCM of Denominator}}$
$= \frac{\text{HCF}(3,7,13)}{\text{LCM}(4,8,14)} = \frac{1}{56}$

70. (a) Product = LCM × HCF
$\Rightarrow$ ab = 60 × 15
Mean proportion = $\sqrt{ab}$
= $\sqrt{60 \times 15}$ = 30

71. (a) HCF of fraction
$= \frac{\text{HCF of Numerator}}{\text{LCM of Denominator}}$
$= \frac{\text{HCF}(11, 9, 16, 10)}{\text{LCM}(25, 20, 15, 33)} = \frac{1}{3300}$

72. (a) Factor of 69 = 3 × 23
Factor of 96
= 2 × 2 × 2 × 2 × 2 × 3
Factor of 99 = 3 × 3 × 11
HCF = 3

73. (b) Factor of 28 = 2 × 2 × 7
Factor of 92 = 2 × 2 × 23
LCM = 2 × 2 × 7 × 23
= 644

SMART APPROACH:-
Check which option are divisible by 28

74. (b) $a^3b - ab^3 = ab(a^2 - b^2)$
$a^3b^2 - a^2b^3 = a^2b^2(a - b)$
$ab(a - b) = ab(a - b)$
LCM = $a^2b^2(a^2 - b^2)$

75. (c) First number × second number = LCM × HCF
= 56 × second number = 840 × 7
$\Rightarrow$ Second number = $\frac{840 \times 7}{56}$
$\Rightarrow$ Second number = 105

76. (c) Let the numbers be $3x$, $7x$ and $11x$.
Hence, HCF = x
$\Rightarrow$ LCM = HCF × product of ratios
$\Rightarrow$ 1386 = x(3 × 7 × 11)
$\Rightarrow x = \frac{1386}{3 \times 7 \times 11}$, x = 6
Least Number = 3x
Greatest Number = $11x$
Sum = $14x$ = 14 × 6 = 84

SMART APPROACH:-
Sum of least and greatest ratio = 3 + 11 = 14 units
Check which option is multiple of 14 if there is only one multiple this will be the best approach

77. (b) 120 = 2 × 2 × 2 × 3 × 5
360 = 2 × 2 × 2 × 3 × 3 × 5
210 = 2 × 3 × 5 × 7
HCF = 2 × 3 × 5 = 30

78. (c) Ratio = 7 : 11, HCF = 28
Difference = (11 – 7) × 28
= 4 × 28 = 112

79. (b) (I) LCM of 15, 18, 36 = 180

Number ⇒ 180 × k + 9

∴ k ⇒ 6

⇒ 180 × 6 + 9

⇒ 1089

(II) By option

In option subtract 9 and divide by 15, 18, 36

80. (b) Ratio = 7 : 13, HCF = 8

LCM = 7 × 13 × 8

= 56 × 13 = 728

81. (d) 5, 6, 8, 10, 12 → LCM = 120

82. (d) LCM of 4, 5, 8, 10, 12

⇒ 120

83. (d) The least number of soldiers = LCM (10, 12, 15, 18, 20) = 180

Required number = 180 × 5 = 900

Therefore, 900 solider can be drawan up in form of a sequare

84. (a) HCF = 29

The largest Number

= 15 × 29 = 435

85. (b) The sum of two number = (7 + 11) × 28 = 18 × 28 = 504

SMART APPROACH:-

Divisibility Rule by 9

86. (b) HCF = 29

The Smallest Number = 29 × 13 = 377

SMART APPROACH:-

Divisibility Rule by 13

87. (d) LCM [3, 5, 8, 9, 10]

⇒ 360 seconds

⇒ 6 minutes

After 6 minutes all the five bells ring together.

88. (a) HCF of $\frac{4}{5}, \frac{6}{8}, \frac{8}{25}$

$\frac{\text{HCF of Numerator}}{\text{LCM of Denomenator}}$

$= \frac{\text{HCF of }(4,6,8)}{\text{LCM of }(5,8,25)} = \frac{2}{200} = \frac{1}{100}$

89. (d) 2388, 4309, 8151,

1921 3842

1921

↓

17 × 113

Three digit number is = 113

When we divide 2388, 4309, 8151 by 113 we find remainder 15 in each case

Remainder = 15

90. (b) LCM of (2, 3, 4, 5, 6, 7) = 420

= 420 n + 1

Put n = 7(Because the x lies between 2800 and 3000)

= 420 × 7 + 1

⇒ 2940 + 1 = 2941

The sum of digit = (2 + 9 + 4 + 1) = 16

91. (a)

4749, 5601, 7092,

852 1491

639

↓

213 × 3

d = 213

After dividing (4749, 5601, 7092) by 213 in each case get remainder = 63

Value of (d + r) = (213 + 63) = 276

92. (d) LCM of (2, 3, 4, 5, 6, 7) = 420

= 420n + 1

= 420 × 5 + 1

= 2100 + 1 = 2101

Sum of digit = (2 + 1 + 0 + 1) = 4

93. (b) LCM of (4, 5, 6, 7, 8, 12) = 840

= 840n + 2

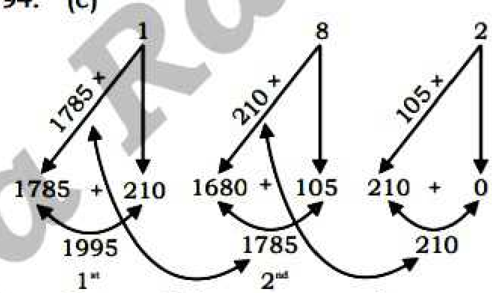
put n = 3

= 840 × 3 + 2 = 2522

2522 is least number which is divisible by 13

Sum of digit = (2 + 5 + 2 + 2) = 11

94. (c)



Some of these two number

1995 + 1785 = 3780

95. (a) 3738 5659 and 9501

1921 3842

1921

H.C.F of 1921, 3842 and 5763

= 1921

When 3738, 5659 and 9501 are divided by 1921

Remainder (y) = 1817

⇒ x + y = 1921 + 1817 = 3738

96. (a) Product = HCF × LCM

⇒$2x \times 3x = 8 \times 48$

⇒$x^2 = 4 \times 16$

⇒$x = 8$

Hence, Largest number

= 8 × 3 = 24

97. (a) Greatest 3-digit number is 999

When 999 is divided by 23, the remainder is 10

So, the greatest 3-digit number which is divisible by 23

= (999 – 10) = 989

Now, the smallest 4-digit number is 1000

When 1000 is divided by 23, the remainder is 11

So, the smallest 4-digit number which is divisible by 23

= 1000 + (23 – 11) = 1012

Hence, Sum of both the numbers

= 989 + 1012 = 2001

98. (b) LCM of (165, 176, 385 and 495)

= 55440

HCF of the number = 11

So, P = $\frac{55440}{11}$ = 5040

99. (d) LCM of (8, 9, 12, 14, 36) = 1008

x be the least number and also divisible by 11

$= \frac{1008x + 4}{11}$ put $x = 1$

= 1008 + 4 = 1012 (divisible by 11)

Least number = 1012

Sum of digit = (1 + 0 + 1 + 2) = 4

100. (a) Number be $81x$ and $81y$

$81x + 81y = 1215$

$x + y = \frac{1215}{81}$

$x + y = 15$

Possible value of x and y for which $81x$ and $81y$ lies between 500 and 700.

Hence, sum of reciprocal of the number is

$\frac{1}{81x} + \frac{1}{81y} = \frac{1}{81}\left(\frac{1}{x} + \frac{1}{y}\right)$

$= \frac{1}{81}\left(\frac{1}{7} + \frac{1}{8}\right)$