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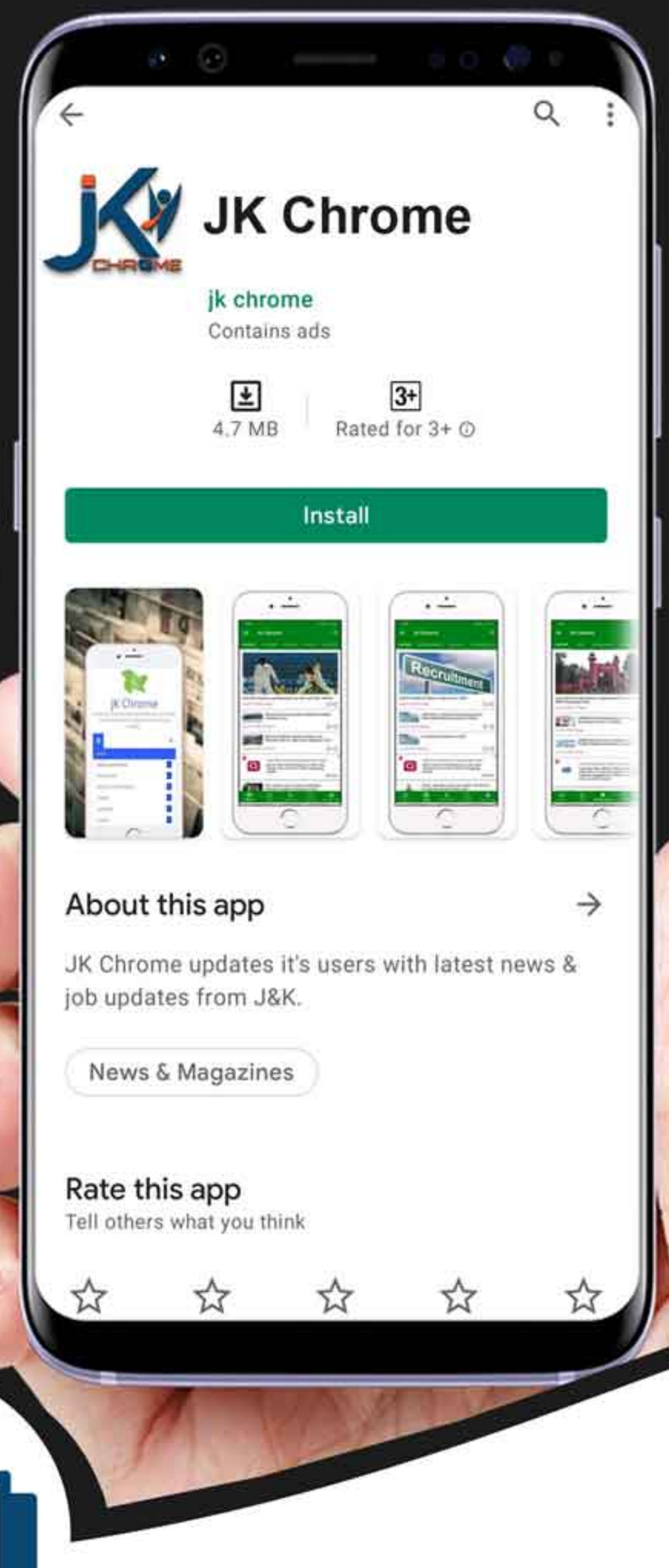

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CHAPTER

1 NUMBER SYSTEM AND HCF & LCM

1. The H.C.F. and L.C.M. of two numebrs are 8 and 48 respectively. If one of the numbers is 24, then the other number is **(SSC CGL 1st Sit. 2010)**
(a) 48 (b) 36 (c) 24 (d) 16

2. The greatest number, which when subtracted from 5834, gives a number exactly divisible by each of 20, 28, 32 and 35, is **(SSC CGL 1st Sit. 2010)**
(a) 1120 (b) 4714 (c) 5200 (d) 5600

3. The ninth term of the sequence 0, 3, 8, 15, 24, 35, ... is **(SSC CGL 1st Sit. 2010)**
(a) 63 (b) 70 (c) 80 (d) 99

4. A number, when divided by 114, leaves remainder 21. If the same number is divided by 19, then the remainder will be **(SSC CGL 1st Sit. 2010)**
(a) 1 (b) 2 (c) 7 (d) 17

5. Two numbers are in the ratio 3 : 4. Their L.C.M. is 84. The greater number is **(SSC CGL 1st Sit. 2010)**
(a) 21 (b) 24 (c) 28 (d) 84

6. The sixth term of the sequence 2, 6, 11, 17, ... is **(SSC CGL 1st Sit. 2010)**
(a) 24 (b) 30 (c) 32 (d) 36

7. A number, when divided by 136, leaves remainder 36. If the same number is divided by 17, the remainder will be **(SSC CGL 2nd Sit. 2010)**
(a) 9 (b) 7 (c) 3 (d) 2

8. A 4–digit number is formed by repeating a 2–digit number such as 1515, 3737, etc. Any number of this form is exactly divisible by **(SSC CGL 2nd Sit. 2010)**
(a) 7 (b) 11 (c) 13 (d) 101

9. The H.C.F. and L.C.M. of two numbers are 12 and 336 respectively. If one of the numbers is 84, the other is **(SSC CGL 2nd Sit. 2010)**
(a) 36 (b) 48 (c) 72 (d) 96

10. The sum of two numbers is 36 and their H.C.F and L.C.M. are 3 and 105 respectively. The sum of the reciprocals of two numbers is **(SSC CGL 2nd Sit. 2010)**
(a) $\frac{2}{35}$ (b) $\frac{3}{25}$ (c) $\frac{4}{35}$ (d) $\frac{2}{25}$

11. If 'n' be any natural number, then by which largest number $(n^3 - n)$ is always divisible ? **(SSC CGL 2nd Sit. 2010)**
(a) 3 (b) 6 (c) 12 (d) 18

12. How many perfect squares lie between 120 and 300 ? **(SSC CGL 2nd Sit. 2010)**
(a) 5 (b) 6 (c) 7 (d) 8

13. The remainder when 3^{21} is divided by 5 is **(SSC CGL 1st Sit. 2011)**
(a) 1 (b) 2 (c) 3 (d) 4

14. The last digit of $(1001)^{2008} + 1002$ is **(SSC CGL 1st Sit. 2011)**
(a) 0 (b) 3 (b) 4 (d) 6

15. If $x * y = (x + 3)^2 (y - 1)$, then the value of $5 * 4$ is **(SSC CGL 1st Sit. 2011)**
(a) 192 (b) 182 (c) $\sqrt{2}$ (d) 356

16. The L.C.M. of three different numbers is 120. Which of the following ***cannot*** be their H.C.F.? **(SSC CGL 1st Sit. 2011)**
(a) 8 (b) 12 (c) 24 (d) 35

17. A number when divided by 49 leaves 32 as remainder. This number when divided by 7 will have the remainder as **(SSC CGL 1st Sit. 2011)**
(a) 4 (b) 3 (c) 2 (d) 5

18. The traffic lights at three different road crossings change after 24 seconds, 36 seconds and 54 seconds respectively. If they all change simultaneously at 10 : 15 :00 AM, then at what time will they again change simultaneously? **(SSC CGL 1st Sit. 2011)**
(a) 10 : 16 : 54 AM (b) 10 : 18 : 36 AM
(c) 10 : 17 : 02 AM (d) 10 : 22 : 12 AM

19. The least number, which is to be added to the greatest number of 4 digits so that the sum may be divisible by 345, is **(SSC CGL 2nd Sit. 2011)**
(a) 50 (b) 6 (c) 60 (d) 5

20. If 17^{200} is divided by 18, the remainder is **(SSC CGL 2nd Sit. 2011)**
(a) 1 (b) 2 (c) 16 (d) 17

21. The unit digit in the sum of $(124)^{372} + (124)^{373}$ is **(SSC CGL 2nd Sit. 2011)**
(a) 5 (b) 4 (c) 2 (d) 0

22. If $a * b = a^b$, then the value of $5 * 3$ is **(SSC CGL 2nd Sit. 2011)**
(a) 125 (b) 243 (c) 53 (d) 15

23. Which one of the following will completely divide $5^{71} + 5^{72} + 5^{73}$? **(SSC CGL 2nd Sit. 2011)**
(a) 150 (b) 160 (c) 155 (d) 30

24. L.C.M. of two numbers is 120 and their H.C.F. is 10. Which of the following can be the sum of those two numbers?
(SSC CGL 2nd Sit. 2011)
(a) 140 (b) 80 (c) 60 (d) 70

25. When 'n' is divisible by 5 the remainder is 2. What is the remainder when n^2 is divided by 5?
(SSC CGL 2nd Sit. 2011)
(a) 2 (b) 3 (c) 1 (d) 4

26. Four runners started running simultaneously from a point on a circular track. They took 200 seconds, 300 seconds, 360 seconds and 450 seconds to complete one round. After how much time they meet at the starting point for the first time?
(SSC CGL 2nd Sit. 2011)
(a) 1800 seconds (b) 3600 seconds
(c) 2400 seconds (d) 4800 seconds

27. The greatest number that can divide 140, 176, 264 leaving remainders of 4, 6, and 9 respectively is
(SSC Sub. Ins. 2012)
(a) 85 (b) 34 (c) 17 (d) 2

28. There are 4 terms in an A.P. such that the sum of two means is 110 and product of their extremes is 2125. The 3rd term is
(SSC Sub. Ins. 2012)
(a) 65 (b) 75 (c) 55 (d) 45

29. The number nearest to 75070 which is divisible by 65, is
(SSC CGL 1st Sit. 2012)
(a) 75070 (b) 75075 (c) 75010 (d) 75065

30. The least number which when divided by 35, 45, 55 leaves the remainder 18, 28, 38 respectively is
(SSC CGL 1st Sit. 2012)
(a) 3448 (b) 3482 (c) 2468 (d) 3265

31. A three-digit number 4a3 is added to another three-digit number 984 to give the four digit number 13*b*7 which is divisible by 11. Then the value of $(a + b)$ is:
(SSC CGL 1st Sit. 2012)
(a) 11 (b) 12 (c) 9 (d) 10

32. The greatest number that will divide 19, 35 and 59 to leave the same remainder in each case is:
(SSC CGL 1st Sit. 2012)
(a) 9 (b) 6 (c) 7 (d) 8

33. The next term of the series
$-1, 6, 25, 62, 123, 214,$ _____ is: **(SSC CGL 1st Sit. 2012)**
(a) 345 (b) 143 (c) 341 (d) 343

34. The next term of the series 1, 5 12, 24, 43 is
(SSC CGL 1st Sit. 2012)
(a) 51 (b) 62 (c) 71 (d) 78

35. The least multiple of 13 which when divided by 4, 5, 6, 7 leaves remainder 3 in each case is
(SSC CGL 2nd Sit. 2012)
(a) 3780 (b) 3783 (c) 2520 (d) 2522

36. What would be the sum of
$1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + ...$ up to 15th term?
(SSC CGL 2nd Sit. 2012)
(a) 250 (b) 240 (c) 225 (d) 265

37. The least number which when divided by 48, 64, 90, 120 will leave the remainders 38, 54, 80, 110 respectively, is
(SSC CGL 2nd Sit. 2012)
(a) 2870 (b) 2860
(c) 2890 (d) 2880

38. If $1^3 + 2^3 + ... + 9^3 = 2025$, then the approx. value of $(0.11)^3 + (0.22)^3 + ... + (0.99)^3$ is **(SSC CGL 2nd Sit. 2012)**
(a) 0.2695 (b) 0.3695
(c) 2.695 (d) 3.695

39. With a two digit prime number, if 18 is added, we get another prime number with digits reversed. How many such numbers are possible? **(SSC CGL 2nd Sit. 2012)**
(a) 2 (b) 3 (c) 0 (d) 1

40. If $x = \dfrac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ and $y = \dfrac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$, then the value of $x^3 + y^3$ is: **(SSC Sub. Ins. 2013)**
(a) 950 (b) 730 (c) 650 (d) 970

41. The ratio of two numbers is 3 : 4 and their HCF is 5. Their LCM is: **(SSC Sub. Ins. 2013)**
(a) 10 (b) 60 (c) 15 (d) 12

42. L.C.M. of $\dfrac{2}{3}, \dfrac{4}{9}, \dfrac{5}{6}$ is **(SSC CHSL 2013)**
(a) $\dfrac{20}{27}$ (b) $\dfrac{8}{27}$ (c) $\dfrac{20}{3}$ (d) $\dfrac{10}{3}$

43. 'a' divides 228 leaving a remainder 18. The biggest two-digit value of 'a' is **(SSC CHSL 2013)**
(a) 30 (b) 70 (c) 21 (d) 35

44. If the sum of the digits of any integer lying between 100 and 1000 is subtracted from the number, the result always is
(SSC CHSL 2013)
(a) divisible by 5 (b) divisible by 6
(c) divisible by 2 (d) divisible by 9

45. The fifth term of the sequence for which $t_1 = 1$, $t_2 = 2$ and $t_{n+2} = t_n + t_{n+1}$, is **(SSC CGL 1st Sit. 2013)**
(a) 5 (b) 10 (c) 6 (d) 8

46. Product of two co-prime numbers is 117. Then their L.C.M. is
(SSC CGL 2013)
(a) 13 (b) 39 (c) 117 (d) 9

47. A number x when divided by 289 leaves 18 as the remainder. The same number when divided by 17 leaves y as a remainder. The value of y is **(SSC CGL 2nd Sit. 2013)**
(a) 3 (b) 1 (c) 5 (d) 2

48. The sum of the squares of the digits of the largest prime number in two digits is **(SSC Multi-Tasking 2014)**
(a) 148 (b) 130 (c) 97 (d) 118

49. Find the number lying between 900 and 1000 which when divided by 38 and 57 leaves in each case a remainder 23.
(SSC Multi-Tasking 2014)
(a) 912 (b) 926
(c) 935 (d) 962

50. The next term of the sequence,

$\left(1+\frac{1}{2}\right),\left(1+\frac{1}{2}\right)\left(1+\frac{1}{3}\right),\left(1+\frac{1}{2}\right)\left(1+\frac{1}{3}\right)\left(1+\frac{1}{4}\right),$ — is

(SSC Sub. Ins. 2014)

(a) 3 (b) $\left(1+\frac{1}{5}\right)$

(c) 5 (d) $\left(1+\frac{1}{2}\right)\left(1+\frac{1}{5}\right)$

51. Three tankers contain 403 litres, 434 litres, 465 litres of diesel respectively. Then the maximum capacity of a container that can measure the diesel of the three container exact number of times is **(SSC Sub. Ins. 2014)**

(a) 31 litres (b) 62 litres (c) 41 litres (d) 84 litres

52. The H.C.F. and L.C.M. of two numbers are 44 and 264 respectively. If the first number is divided by 2, the quotient is 44. The other number is **(SSC CHSL 2014)**

(a) 147 (b) 528 (c) 132 (d) 264

53. A teacher wants to arrange his students in an equal number of rows and columns. If there are 1369 students, the number of students in the last row are **(SSC CHSL 2014)**

(a) 37 (b) 33 (c) 63 (d) 47

54. The first term of an Arithmetic Progression is 22 and the last term is –11. If the sum is 66, the number of terms in the sequence are : **(SSC CHSL 2014)**

(a) 10 (b) 12 (c) 9 (d) 8

55. If the product of first fifty positive consecutive integers be divisible by 7^n, where n is an integer, then the largest possible value of n is **(SSC CGL 1st Sit. 2014)**

(a) 7 (b) 8 (c) 10 (d) 5

56. The smallest five digit number which is divisible by 12, 18 and 21 is : **(SSC CHSL 2015)**

(a) 50321 (b) 10224 (c) 30256 (d) 10080

57. If $1^3+2^3+.....+10^3-3025$, then the value of $2^3+4^3+.....+20^3$ is : **(SSC CHSL 2015)**

(a) 5060 (b) 12100

(c) 24200 (d) 7590

58. The least number that should be added to 2055 so that the sum is exactly divisible by 27 : **(SSC CGL 1st Sit. 2015)**

(a) 24 (b) 27 (c) 31 (d) 28

59. The least number which when divided by 6, 9, 12, 15, 18 leaves the same remainder 2 in each case is: **(SSC CGL 2nd Sit. 2015)**

(a) 178 (b) 182 (c) 176 (d) 180

60. What least value must be assigned to '*' so that the numbers 451*603 is exactly divisible by 9? **(SSC CGL 1st Sit. 2016)**

(a) 7 (b) 8 (c) 5 (d) 9

61. If X and Y are the two digits of the number 347XY such that the number is completely divisible by 80, then what is the value of X + Y? **(SSC CGL 2017)**

(a) 2 (b) 4 (c) 6 (d) 8

62. How many numbers are there from 300 to 650 which are completely divisible by both 5 and 7? **(SSC CGL 2017)**

(a) 8 (b) 9 (c) 10 (d) 12

63. Which value among $\sqrt[3]{5},\sqrt[4]{6},\sqrt[6]{12},\sqrt[12]{276}$ is the largest? **(SSC CGL 2017)**

(a) $\sqrt[3]{5}$ (b) $\sqrt[4]{6}$ (c) $\sqrt[6]{12}$ (d) $\sqrt[12]{276}$

64. By which least number should 5000 be divided so that it becomes a perfect square? **(SSC CGL 2017)**

(a) 2 (b) 5 (c) 10 (d) 25

65. What is the LCM (least common multiple) of 57 and 93? **(SSC CHSL 2017)**

(a) 1767 (b) 1567 (c) 1576 (d) 1919

66. Product of digits of a 2–digit number is 27. If we add 54 to the number, the new number obtained is a number formed by interchange of the digits. Find the number. **(SSC CHSL 2017)**

(a) 39 (b) 93 (c) 63 (d) 36

67. The least number of five digits exactly divisible by 88 is: **(SSC MTS 2017)**

(a) 10088 (b) 10023 (c) 10132 (d) 10032

68. Of the three numbers, the first is twice the second, and the second is twice the third. The average of the reciprocal of the numbers is 7/12. The numbers are: **(SSC MTS 2017)**

(a) 20, 10, 5 (b) 4, 2, 1

(c) 36, 18, 9 (d) 16, 8, 4

69. What is the smallest value that must be added to 709, so that the resultant is a perfect square? **(SSC Sub. Ins. 2017)**

(a) 8 (b) 12 (c) 20 (d) 32

70. Which one among $\sqrt{10}+\sqrt{4},\sqrt{11}+\sqrt{3},\sqrt{7}+\sqrt{7}$ is the smallest number? **(SSC Sub. Ins. 2017)**

(a) $\sqrt{10}+\sqrt{4}$ (b) $\sqrt{11}+\sqrt{3}$

(c) $\sqrt{7}+\sqrt{7}$ (d) All are equal

71. If 34N is divisible by 11, then what is the value of N? **(SSC Sub. Ins. 2017)**

(a) 1 (b) 3 (c) 4 (d) 9

72. What is the sum of the digits of the least number, which when divided by 12,16 and 54, leaves the same remainder 7 in each case, and is also completely divisible by 13? **(SSC Sub. Ins. 2018)**

(a) 36 (b) 16 (c) 9 (d) 27

73. If the seven digit number $74x29y6$ is divisible by 72, then what will be the value of $(2x+3y)$? **(SSC Sub. Ins. 2018)**

(a) 21 (b) 20 (c) 19 (d) 16

74. Two numbers are in the ratio 4 : 7. If their HCF is 26, then the sum of these two numbers will be: **(SSC Sub. Ins. 2018)**

(a) 364 (b) 286 (c) 338 (d) 312

75. The square root of which of the following is a rational number? **(SSC Sub. Ins. 2018)**

(a) 5823.82 (b) 1489.96

(c) 22504.9 (d) 2460.14

76. If $x = \frac{1}{12.13} + \frac{1}{13.14} + \frac{1}{14.15} + \cdots ... + \frac{1}{23.24}$

$y = \frac{1}{36.37} + \frac{1}{37.38} + \frac{1}{38.39} + \cdots ... + \frac{1}{71.72}$ then $\frac{x}{y}$ is equal to : **(SSC CHSL-2018)**

(a) $\frac{1}{3}$ (b) $\frac{1}{24}$ (c) $\frac{1}{72}$ (d) 3

77. Which among the following numbers is exactly divisible by 11.13 and 7? **(SSC CHSL-2018)**

(a) 259237 (b) 259248 (c) 259270 (d) 259259

78. If the six digit number $15x^1y^2$ is divisible by 44, then $(x + y)$ is equal to: **(SSC CGL-2018)**

(a) 8 (b) 7 (c) 6 (d) 9

79. What is the value of x so that the seven digit number 8439x53 is divisible by 99? **(SSC CGL-2018)**

(a) 9 (b) 4 (c) 3 (d) 6

80. What is the median of the given data? **(SSC MTS 2018)**
41, 43, 46, 50, 85, 61, 76, 55, 58, 95

(a) 61 (b) 58 (c) 57 (d) 55

81. If A is the smallest three digit number divisible by both 6 and 7 and B is the largest four digit number divisible by both 6 and 7, then what is the value of B – A? **(SSC MTS 2018)**

(a) 9912 (b) 9870 (c) 9996 (d) 9954

82. If the number 1005x4 is completely divisible by 8, then the smallest integer in place of x will be : **(SSC CGL 2019-20)**

(a) 1 (b) 0 (c) 4 (d) 2

83. What is the HCF of $2^3 \times 3^4$ and $2^5 \times 3^2$? **(SSC MTS 2019-20)**

(a) $2^5 \times 3^3$ (b) $2^3 \times 3^4$ (c) $2^3 \times 3^2$ (d) $2^5 \times 3^4$

84. Table given below shows the number of students having obtained different marks. **(SSC MTS 2019-20)**

Marks	Number of students	Marks	Number of students
9 – 11	6	11 – 13	5
13 – 15	2	15 – 17	2
17 – 19	5		

What is the mean marks per student?

(a) 13.5 (b) 12.25 (c) 15.5 (d) 14.25

85. When $(77^{77} + 77)$ is divided by 78, the remainder is: **(SSC CHSL 2019-20)**

(a) 74 (b) 77 (c) 75 (d) 76

86. Find the greatest value of b so that $30a68b$ $(a > b)$ is divisible by 11. **(SSC CGL 2020-21)**

(a) 4 (b) 6 (c) 3 (d) 9

87. If the nine-digit number '8475639AB' is divisible by 99, then what is the value of A and B? **(SSC CHSL 2020-21)**

(a) A = 4, B = 8 (b) A = 3, B = 9

(c) A = 5, B = 3 (d) A = 4, B = 6

88. Which is the largest number that will divide 2036 and 233 leaving remainders 12 and 13, respectively? **(SSC MTS 2020-21)**

(a) 36 (b) 42 (c) 44 (d) 46

89. In a week, the weights of a bag of tea were 350 kg, 340 kg, 270 kg, 360 kg, 310 kg, 300 kg. The range (in kg) is: **(SSC MTS 2020-21)**

(a) 80 (b) 70 (c) 90 (d) 100®

90. If a nine-digit number 785x3678y is divisibie by 72, then the value of $(x - y)$ is: **(SSC Sub-Inspector 2020-21)**

(a) – 2 (b) 0 (c) 2 (d) – 1

91. Two numbers are in the ratio 7 : 11. If their HCF is 28, then the difference between the two numbers is: **(SSC Sub-Inspector 2020-21)**

(a) 28 (b) 308 (c) 112 (d) 196

92. What is the least number which when divided by 15, 18 and 36 leaves the same remainder 9 in each case and is divisible by 11? **(SSC Sub-Inspector 2020-21)**

(a) 1269 (b) 1071 (c) 1089 (d) 1080

93. If $14331433 \times 1422 \times 1425$ is divided by 12, then what is the remainder ? **(SSC Sub-Inspector 2020-21)**

(a) 3 (b) 6 (c) 9 (d) 8

HINTS & EXPLANATIONS

1. (d) $p \times q = HCF \times LCM$

$\therefore$ Second number $= \frac{8 \times 48}{24} = 16$

$\therefore$ LCM $= 2 \times 2 \times 5 \times 7 \times 8 = 1120$

$\therefore$ Required number $= 5834 - 1120 = 4714$

2. (b)

2	20, 28, 32, 35
2	10, 14, 16, 35
5	5, 7, 8, 35
7	1, 7, 8, 7
	1, 1, 8, 1

3. (c) $0 + 3 = 3$
$3 + 5 = 8$
$8 + 7 = 15$
$15 + 9 = 24$
$24 + 11 = 35$
$35 + 13 = 48$
$48 + 15 = 63$
$63 + 17 = \boxed{80}$

4. (b) If the first divisor is a multiple of second divisor. Then, remainder by the second divisor.
$\therefore$ Remainder $= 21 \div 19 = 2$

5. (c) Let the numbers be 3x and 4x.
$\therefore$ Their LCM $= 12x$
$\therefore 12x = 84$

$$\Rightarrow x = \frac{84}{12} = 7$$

$\therefore$ Larger number $= 4x = 4 \times 7 = 28$

6. (c) $2 + 4 = 6$
$6 + 5 = 11$
$11 + 6 = 17$
$17 + 7 = 24$
$24 + 8 = \boxed{32}$

7. (d) If the first divisor be a multiple of the second divisor, then required remainder = remainder obtained by dividing the first remainder (36) by the second divisor (17) = 2
$\because$ 17 is a factor of 136
$\therefore$ Remainder when 36 is divided by 17 = 2

8. (d) $xyxy = xy \times 100 + xy$
$= xy(100 + 1) = 101 \times xy$
Hence, the number is exactly divisible by 101.

9. (b) First number $\times$ second number
= HCF $\times$ LCM
$\Rightarrow 84 \times$ second number $= 12 \times 336$
$\therefore$ Second number

$$= \frac{12 \times 336}{84} = 48$$

$p \times q =$ HCF $\times$ LCM

$$q = \frac{12 \times 336}{84} = 48$$

10. (c) Let the numbers be 3x and 3y.
$\therefore 3x + 3y = 36$
$\Rightarrow x + y = 12$ ...(i)
and $3xy = 105$ ...(ii)
Dividing equation (i) by (ii), we have

$$\frac{x}{3xy} + \frac{y}{3xy} = \frac{12}{105}$$

$$\Rightarrow \frac{1}{3y} + \frac{1}{3x} = \frac{4}{35}$$

Shortcut Method:

$$\frac{1}{x} + \frac{1}{y} = \frac{x + y}{xy}$$

11. (b) $n^3 - n = (n^2 - 1)$
$\Rightarrow n(n+1)(n-1)$
For $n = 2$, $n^3 - n = 6$
$2^3 - 2 = 6$
i.e. $n^3 - n$ is always divisible by 6.

12. (c) $11^2 = 121$, $12^2 = 144$, $13^2 = 169$, $14^2 = 196$
$15^2 = 225$, $16^2 = 256$, $17^2 = 289$
Square no above 120 = 121 of 11
Square no below 300 = 289 of 17
Total 11, 12, 13, 14, 15, 16, 17, i.e. 7 no.

Alternate Method:
First square number above 120 is 121
$11^2 > 120$ and $18^2 > 300$
Hence, required number of squares between 120 to 300
$= 18 - 11 = 7$

13. (c) $3^1 = 3$; $3^2 = 9$; $3^3 = 27$; $3^5 = 81$; $3^5 = 243$
i.e. unit's digit is repeated after index 4.
Remainder after dividing 21 by 4 = 1
$\therefore$ Unit's digit in the expansion of $(3)^{21} = 3$
$\therefore$ Remainder after dividing by 5 = 3

14. (b) Last digit of $(1001)^{2008} + 1002 = 1 + 2 = 3$

15. (c) $x \bigstar y = (x+3)^2 (y-1)$
$\therefore 5 \bigstar 4 = (5+3)^2 (4-1)$
$= 64 \times 3 = 192$

16. (d) HCF must be a factor of LCM from option 35 is not factor of 120.
OR

Alternate Method:
If two number are in the form of ax and bx then
x is H.C.F and $a \times b \times x$ is their L.C.M
Hence L.C.M is always divisible by H.C.F.

17. (a) Here, the first divisor i.e. 49 is multiple of second divisor i.e. 7.
$\therefore$ Required remainder = Remainder obtained on dividing 32 by 7 = 4

18. (b) LCM of 24, 36 and 54 seconds
= 216 seconds = 3 minutes 36 seconds
$\therefore$ Required time = 10 : 15 : 00 +
3 minutes 36 seconds = 10 : 18 : 36 a.m.

19. (b) The largest 4-digit number = 9999

$$\begin{array}{r} 345)9999(28 \\ \underline{690} \\ 3099 \\ \underline{2760} \\ 339 \end{array}$$

$\therefore$ Required number $= 345 - 339 = 6$

20. (a) Remainder when $(x-1)^n$ is divided by x is $(-1)^n$
$\therefore (17)^{200} = (18-1)^{200}$
$\therefore$ Remainder $= (-1)^{200} = 1$

Alternate Method:
$a^n - b^n$ is completely divisible by a + b. If n is an even number in the case of $17^{200} \div 18$
$17^{200} - 1^{200}$ is completely divisible by 17 + 1 = 18
Here, 1 is remainder.
Or in other words if a^n is divided by a + 1 and n is even number then it always left 1 as remainder.

21. (d) $4^1 = 4; 4^2 = 16; 4^3 = 64; 4^4 = 256; 4^5 = 1024$

Remainder on dividing 372 by 4 = 0

Remainder on dividing 373 by 4 = 1

$\therefore$ Required unit digit

= Unit's digit of the sum = 6 + 4 = 0

22. (a) $a * b = a^b$

$\therefore 5 * 3 = 5^3 = 5 \times 5 \times 5 = 125$

23. (c) $5^{71} + 5^{72} + 5^{73}$

$= 5^{71}(1 + 5 + 5^2) = 5^{70} \times 5 \times 31$

$= 5^{71} \times 155$ which is exactly divisible by 155.

24. (d) Let the numbers be 10x and 10y where x and y are prime to each other.

$\therefore$ LCM = 10 xy

$\Rightarrow 10xy = 120 \qquad \Rightarrow xy = 12$

Posssible pairs = (3, 4) or (1, 12)

$\therefore$ Sum of the numbers = 30 + 40 = 70

> **Alternate Method:**
> If two different numbers are in form of ax and bx H.C.F of these numbers is x and L.C.M of these numbers is abx
> Now a and b are co-prime terms in L.C.M.
> $10 \times a \times b = 120$
> $a \times b = 12 \rightarrow 1 \times 12$
> 2×6 this is not a pair of co prime terms.
> 3×4

25. (d) Required remainder = Remainder obtained by dividing 2^2 by 5.

Remainder = 4

26. (a) Required time = LCM of 200, 300, 360 and 450 seconds = 1800 seconds.

27. (c) Required number = H.C.F of (140 – 4), (176 – 6) and (264 – 9) = H.C.F. of 136, 170 and 255.

```
136)255(1
    136
    119)136(1
        119
         17)119(7
            119
             ×
```

```
136)170(1
    136
     34)136(4
        136
         ×
```

$\therefore$ Required number = 17

> **Alternate Method:**
> Here divisible terms are 140 – 4 = 136, 176 – 6 = 170 and 264 – 9 = 255
> Now, difference between these numbers
> 170 – 136 = 34
> 225 – 170 = 85
> H.C.F of difference = 17
> Hence required number = 17.

28. (a) Let the 4 terms in A.P are a – 3d, a – d, a + d, a + 3d

According to question

$a - d + a + d = 110$ ...(1)

$(a - 3d)(a + 3d) = 2125$ ...(2)

From equation (1)

$a - d + a + d = 110$

$2a = 110 \Rightarrow a = 55$

From equation (2)

$(a - 3d)(a + 3d) = 2125$

$\Rightarrow a^2 - 9d^2 = 2125$

$\Rightarrow (55)^2 - 9d^2 = 2125$

$\Rightarrow 3025 - 9d^2 = 2125$

$\Rightarrow 900 = 9d^2 \Rightarrow d^2 = 100 \Rightarrow d = 10$

$\therefore \; a = 55, d = +10$

series would be :

25, 45, 65, 85

IIIrd term would be 65.

29. (b)

```
65)75070(1154
   65
   100
    65
    357
    325
    320
    260
     60
```

$\therefore$ Required number

= 75070 + (65 – 60) = 75075

30. (a) 35 – 18 = 17

45 – 28 = 17

55 – 38 = 17

i.e., difference between the divisor and correseponding remainder is same.

LCM of 35, 45 and 55 = 3465

$\therefore$ Required number

= 3465 – 17 = 3448

31. (d)

```
  4 a 3
  9 8 4
13 b 7
```

$\because$ 13b7 is exactly divisible by 11.

$\therefore b = 9 \therefore a = 1$

$\therefore a + b = 9 + 1 = 10$

32. (d) Required number = HCF of (35 – 19), (59 – 35) and (59 – 19) = HCF 16, 24 and 40 = 8

33. (c) The pattern is :

$1^3 - 2 = -1$

$2^3 - 2 = 6$

$3^3 - 2 = 25$

$4^3 - 2 = 62$

$5^3 - 2 = 123$

$6^3 - 2 = 214$

$7^3 - 2 = \boxed{341}$

34. (c) The pattern is :

$1+4=5$

$5+7\,(=4+3)=12$

$12+12\,(=7+5)=24$

$24+19\,(=12+7)=43$

$43+28\,(=19+9)=\boxed{71}$

35. (b) LCM of 4, 5, 6 and $7=420$

$\therefore$ Required number

$=420k+3$ which is exactly divisible by 13.

$=32\times 13k+4k+3$

Hence, $4k+3$ should be divisible by 13 for some value of k.

For $k=9$, $4k+3=39$ which is divisible by 13.

$\therefore$ Required number $=420\times 9+3=3783$

36. (c) The sum forms A.P.

First term (a) = 1

Common difference (d) = 2

$$\text{Sum of 15 term} = \frac{n}{2}(2a+(n-1)d)$$

$$\text{Sum} = \frac{15}{2}(2\times 1+(15-1)2)$$

$$= \frac{15}{2}\times 30 = 225$$

37. (a) Here, $(48-38)=10, (64-54)=10, (90-80)=10$ and $(120-110)=10$.

$\therefore$ Required number = (L.C.M of 48, 64, 90 and 120) -10

$=2870$

38. (c) $(0.11)^3\,(1^3+2^3+.....+9^3)$

$=0.001331\times 2025$

$$= \frac{1331}{40000} \approx 2.695$$

39. (a) Let the number be $10x+y$.

According to condition

$10x+y+18=10y+x$

$y-x=2$

So those numbers are 02, 13, 24, 35, 46, 57, 68, 79, 80

But 13 and 79 are prime numbers.

40. (d) $$x=\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}=\frac{\left(\sqrt{3}-\sqrt{2}\right)\left(\sqrt{3}-\sqrt{2}\right)}{\left(\sqrt{3}+\sqrt{2}\right)\left(\sqrt{3}-\sqrt{2}\right)}$$

$$=\frac{\left(\sqrt{3}-\sqrt{2}\right)^2}{3-2}=3+2-2\sqrt{3}.\sqrt{2}=5-2\sqrt{6}$$

$$\therefore y=\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}=5+2\sqrt{6}$$

$$\therefore x+y=5-2\sqrt{6}+5+2\sqrt{6}=10$$

$$xy=\left(5-2\sqrt{6}\right)\cdot\left(5+2\sqrt{6}\right)$$

$=25-24=1$

$\therefore x^3+y^3=(x+y)^3-3xy\,(x+y)$

$=(10)^3-3(10)=1000-30=970$

41. (b) If the numbers be $3x$ and $4x$, then

HCF $=x=5$

$\therefore$ Number = 15 and 20

$\therefore$ LCM $=12x=12\times 5=60$

> **Alternate Method:**
> If two numbers are in the form of $3x$ and $4x$ then their L.C.M $=3\times 4\times x$
> $=3\times 4\times 5=60$

42. (c) LCM of $\frac{2}{3}, \frac{4}{9}, \frac{5}{6}$

$$\frac{LCM\ of\ (2,4,5)}{HCF\ of\ (3,9,6)}=\frac{20}{3}$$

43. (b) $228-18=210$ is exactly divisible biggest two digit no. i.e. 70

44. (d) $(100x+10y+z)-(x+y+z)=99x+9y$

$=9\,(11x+y)$

45. (d) $t_{n+2}=t_n+t_{n+1}$

$t_2=t_2+t_2=3$

$t_4=t_3+t_2=3+2=5$

$t_5=t_4+t_3=3+5=8$

46. (c) HCF of two-prime numbers = 1

$\therefore$ Product of numbers = their LCM = 117

47. (b) Here, the first divisor (289) is a multiple of second divisor (17).

$\therefore$ Required remainder = Remainder obtained on dividing 18 by 17 = 1

48. (b) Largest two digit prime number is 97

$9^2+7^2=81+49=130$

49. (c) L.C.M of $(38, 57)=114$

Multiple of 114 between 900 and 1000 = 912

number which leaves 23 = $912+23=935$

50. (a) Next term will be

$$\left(1+\frac{1}{2}\right)\left(1+\frac{1}{3}\right)\left(1+\frac{1}{4}\right)\left(1+\frac{1}{5}\right)$$

$$=\frac{3}{2}\times\frac{4}{3}\times\frac{5}{4}\times\frac{6}{5}=3$$

51. (a) H.C.F. of 403, 434 and 465 is 31.

52. (c) First number $=2\times 44=88$

$$\text{Other number}=\frac{44\times 264}{88}=132$$

53. (a) If they are equal number of rows and columns then,

$\sqrt{1369}=37$

54. (b) The sum of Arithmetic Progression is given by

$$s=\frac{n}{2}(a+l)$$

$$66=\frac{n}{2}(22-11)=\frac{n}{2}\times 11$$

$n=12$

55. (b) Product of first fifty positive consecutive integers $= 1 \times 2 \times .... \times 50 = 50!$

Largest possible value of n

$$= \left[\frac{50}{7}\right] + \left[\frac{50}{7^2}\right] = 7 + 1 = 8$$

56. (d) Lowest 5 digit number = 10,000

The number which is divisible by 12, 18 and 21 is LCM of 12, 18, 12 which is 252.

$\frac{10000}{252}$ gives 172 as remainder

So, $252 - 172 = 80$

$10{,}000 + 80 = 10080$

If 10080 when divided by 12, 18 and 21 gives 0 as remainder

So, 10080 is the least 5–digit number.

57. (c) $2^3 + 4^3 + 6^3 + ------ + 20^3$

$= 2^3 (1^3 + 2^3 + 3^3 + ------ + 10^3)$

$$= 2^3 \times \left(\frac{(n)(n+1)}{2}\right)^2 8 \times \left(\frac{10 \times 11}{2}\right)^2 = 8 \times 3025$$

$= 24200$

58. (a) Number has to be less than 27. Let the number be x. On Dividing 2055 by 27, we get remainder as 3

Now, $3 + x = 27$

$\therefore x = 24$

59. (b) LCM of 6, 9, 12, 15 and 18

2	6,9,12,15,18
3	3,9,6,15,9
3	1,3,2,5,3
	1,1,2,5,1

$LCM = 2 \times 3 \times 3 \times 2 \times 5 = 180$

Least number $= 180 + 2 = 182$

60. (b) To divide 451 * 603 by 9

$(4 + 5 + 1 + * + 6 + 0 + 3) = (19 + *)$

$(19 + *)$ must be multiple of 9

$\therefore 19 + * = 27$

$* = 8$

61. (a) 347XY as 347X0. Since 8 is a factor of 80.

347X0 is divisible by 8. It means last three digits 7X0 is divisible by 8.

Hence, X is 2 or 6

if X = 6, number is 34760. But this is not divisible by 80.

if X = 2, number is 34720, which is divisible by 80.

Therefore, number is 34720 with X = 2 and Y = 0.

$\therefore \quad x + y = 2 + 0 = 2.$

62. (c) LCM of 5 and 7 = 35

So, the numbers divisible by both 5 and 7 are multilpe of 35. Between 300 and 650. We have 10 multiple of 35. They are : 315, 350, 385, 420, 455, 490, 525, 560, 595, 630.

63. (a) $\sqrt[3]{5} = 5^{\frac{1}{3} \times 12} = 5^4 = 625$

$\sqrt[4]{6} = 6^{\frac{1}{4} \times 12} = 6^3 = 216$

$\sqrt[6]{12} = 12^{\frac{1}{6} \times 12} = 12^2 = 144$

$\sqrt[12]{276} = 276^{\frac{1}{12} \times 12} = 276^1 = 276$

So, option (a) is correct.

64. (a) According to option,

$5000 \div 2 = 2500$

Hence, 2500 is a perfect square of 50.

65. (a) LCM of 57 and 93,

3	57, 93
	19, 31

$\Rightarrow \quad 3 \times 19 \times 31 = 1767.$

So, Required answer is 1767.

66. (a) Let digit at ten's place be x and digit at unit's place be y.

$\therefore$ The number $= 10x + y$

When digit are interchanged, the new number $= 10y + x$

According to question,

Product of digits = 27 i.e., $xy = 27$ ...(i)

Also,

$10x + y + 54 = 10y + x$

$9x - 9y = -54$

$x - y = -6$

$\therefore \quad x = y - 6$ ...(ii)

From (i) and (ii),

$y(y - 6) = 27$

$y^2 - 6y - 27 = 0$

$y^2 - 9y + 3y - 27 = 0$

$(y - 9)(y + 3) = 0$

$\therefore \quad y = 9$ or $y = -3$

$\therefore \quad x = 3$

When $x = 3$, and $y = 9$

$\therefore$ Required number $= 10x + y$

$= 10 \times 3 + 9$

$\Rightarrow \quad 30 + 9 = 39.$

67. (d) The smallest number of 5 digits = 10000

Now, $\frac{10000}{88} = 113$, and remainder is 56

$\therefore$ Required number $= 10000 + (88 - 56) = (10000 + 32)$

$= 10032.$

68. (c) Let third number = x

then,

second number = 2x

first number = 4 x

According to question

$$\frac{\left(\frac{1}{x}+\frac{1}{2x}+\frac{1}{4x}\right)}{3}=\frac{7}{12}$$

$\therefore \quad x=9$

$\therefore$ first number $=4x=4\times 9=36$

second number $=2x=2\times 9=18$

third number $=x=9$

69. (c) According to question

$26<\sqrt{709}<27$

Now, $(27)^2=729$

$\therefore \quad 729-709=20$

$\therefore$ 20 must be added to 709 to make it a perfect square.

70. (b) Here,

$\sqrt{10}+\sqrt{4}=3.16+2=5.16$

$\sqrt{11}+\sqrt{3}=3.31+1.73=5.04$

$\sqrt{7}+\sqrt{7}=2.64+2.64=5.28$

So, $\sqrt{11}+\sqrt{3}$ is the smallest number.

71. (a) A number is divisible by 11, if difference of the sum of the digits at the even places and sum of digits at odd places is either 0 (zero) or a multiple of 11.

Now,

$(3+N)-4=0$

$3+N-4=0$

$N-1=0$

$\therefore \quad N=1$

72. (b) L.C.M. of 12, 16 and 54.

$12=2\times 2\times 3.$

$16=2\times 2\times 2\times 2.$

$54=2\times 3\times 3\times 3$

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

Remainder $=7$.

So, required number $=432+7=439$.

But this is not divisible by 13.

so, next number is $432\times 2+7=871$.

Number 871 is divisible by 13.

Hence, required number is 871.

Sum of its digits $=8+7+1=16$.

73. (c) Any number that is divisible by 72 must be divisible by 3, 4, 8, and 9.

Now, a number is divisible by 4 when a number formed by its last two digits of that number is divisible by 4. '$y6$' is divisible by 4, for

$y=1,3,5,7,9$

Again a, number is divisible by 8, when a number formed by its last 3 digits is divisible by 8.

'9y6' is divisible by '8' for $y=3,7$

Now, for divisibility by 9, sum of its digits should be divisible by 9.

for $y=3$, $7+4+x+2+9+3+6=31+x$

so, for $x=5$, 36 is divisible by 9.

Now, is '7452936' which is divisible by '24' also, so, it is divisible '72'.

Now, $(2x+3y)=2\times 5+3\times 3=19$.

74. (b) Let the two numbers are $4x$ and $7x$.

H. C. F. of $4x$ and $7x=x$.

Now, $x=26$.

So, two numbers are 4×26 and 7×26.

Sum of two numbers $=4\times 26+7\times 26=11\times 26=286$.

75. (b) $x^2=1489.96=\frac{148996}{100}$

$$\therefore x=\sqrt{\frac{148996}{100}}=\sqrt{\left(\frac{386}{10}\right)^2}=\frac{386}{10}=38.6$$

76. (d) $x=\frac{1}{12.13}+\frac{1}{13.14}+\frac{1}{14.15}+....+\frac{1}{23.24}$

$=\frac{13-12}{12.13}+\frac{14-13}{13.14}+\frac{15-14}{14.15}+....+\frac{24-23}{23.24}$

$=\frac{1}{12}-\frac{1}{13}+\frac{1}{13}-\frac{1}{14}+\frac{1}{14}-\frac{1}{15}+....\frac{1}{23}-\frac{1}{24}$

$x=\frac{1}{12}-\frac{1}{24}=\frac{2-1}{24}=\frac{1}{24}$

$y=\frac{1}{36.37}+\frac{1}{37.38}+\frac{1}{38.39}+....+\frac{1}{71.72}$

$=\frac{37-36}{36.37}+\frac{38-37}{37.38}+\frac{39-38}{38.39}+....+\frac{72-71}{71.72}$

$=\frac{1}{36}-\frac{1}{37}+\frac{1}{37}-\frac{1}{38}+\frac{1}{38}-\frac{1}{39}+....+\frac{1}{71}-\frac{1}{72}$

$y=\frac{1}{36}-\frac{1}{72}=\frac{2-1}{72}=\frac{1}{72}$

Now,

$$\frac{x}{y}=\frac{\frac{1}{24}}{\frac{1}{72}}=\frac{72}{24}=3$$

77. (d) L. C. M. of 11, 13 and 7

$=11\times 13\times 7=1001$.

Now, from given option '259259' is divisible by '1001'.

Hence, '259259' is divisible by 11, 13 and 7.

78. (b) Any number which divisible by 44, must be divisible by 11 also is

And for any number divisible by 11 the difference of sum of its digits at odd and even places be divisible by 11.

For the given number 15x 1y2

$(x+y+1)-(5+1+2)=0$

$x+y=7$

79. (b) $8439x53$ is divisible by 99 i.e.
given number is divisible by 11
$\therefore (3+x+3+8)-(5+9+4)=0,\ x=4$

80. (b) To find the mediam
(1) Arrange the numbers in increasing order.
(2) Here we have even no. of term. So, we have to add the two middle terms and divide by 2.
Data arrange in increasing order

41 43 46 50 $\boxed{55\ \ 61}$ 68 76 85 95

Hence the median is $\frac{55+61}{2}=\frac{116}{2}=58$

81. (b) L.C.M. of 6 and 7 = 42
Smallest 3 digits number divisible by 6 and 7 is the same that is divisible by 42
and that number is $A=42\times3=126$
Largest 4 digits number that is divisible by 6 and 7 is the some that is divisible by 42
and that number is $B=238\times42=9996$
Now, B – A. = 9996 – 126 = 9870

82. (b) The rule of 8 $\Rightarrow$ If the last three digit of a whole number are divisible by 8 then the entire number is divisible by 8
Put $x=0$ and we see that 504 is divided by 8.
So, 0 is smallest integer.

83. (c) $H.C.F=2^3\times3^2$

84. (a) Men Marks

$$=\frac{10\times6+12\times5+14\times2+16\times2+18\times5}{20}=\frac{270}{20}=13.5$$

85. (d) We know that (x^n+1) is divisible by $(x+1)$, for all odd values of n.

$\therefore 77^{77}+77=\{(77^{77}+1)+76\}$
Now, $(77^{77}+1)$ will be divisible by $(77+1)=78$
Hence, remainder = 76.

86. (c) $30a68b$

When a number is divisible by 11, then the difference of sum of odd places digits and the sum of even places digits is 0 or multiple of 11.
$(8+a+3)-(b+6+0)$
$=(11+a)-(6+b)$
From the option,
If $b=3$ then, $a=9$
and it will divisible by 11.

87. (a) If a number is divisible by 99, then it will also divisible by 9 and 11.
8475639AB

Divisibility by 11: The difference between the sum of odd places digits and sum of even places digits from right hand side should be zero or the factor of 11.

Divisibility by 9: The sum of digits should be divisible by 9.
Sum of digits = 8+4+7+5+6+3+9+A+B
= 42 + (A + B)
$\therefore$ (A + B) should be 3 or 12.
Difference of odd places digits and even places digits
= (B+9+6+7+8) – (A+3+5+4)
= B + 30 – (A + 12)
= (B – A) + 18
$\therefore$ (B – A) should be 4
From the options, option 'a' satisfy the conditions.
$\therefore$ A = 4, B = 8
A + B = 12
B – A = 4

88. (c) Largest number woluld be HCF of (2036 – 12) and (233 – 13) or HCF of 2024, 220
$\therefore$ HCF of 2024 and 220 :
$2024=2\times4\times11\times23$
$220=2\times2\times5\times11$
$\therefore$ HCF = 44
So, the number would be 44.

89. (c) Weights of bag of tea,
350 kg, 280 kg, 340 kg, 270 kg, 360 kg, 310 kg, 300 kg
$\therefore$ Range = highest weight – lowest weight
= 360 – 270 = 90 kg

90. (c) $785x3678y$
divisibility of 8 = last three digits divisible by 8
$\frac{78y}{8}\Rightarrow y=4$
divisibility of 9 = sum of digits divisible by 9
$x=6$
$x-y=6-4=2$

91. (c) Difference = $(11-7)\times28=112$

92. (c) 1089 is divisible by 11.

$\frac{1089}{15}$ = Remainder 9

$\frac{1089}{18}$ = Remainder 9

$\frac{1089}{36}$ = Remainder 9

93. (b) $\frac{14331433\times1422\times1425}{12}$

$=\frac{1\times6\times9}{12}=\frac{54}{12}$
= Remainder 6

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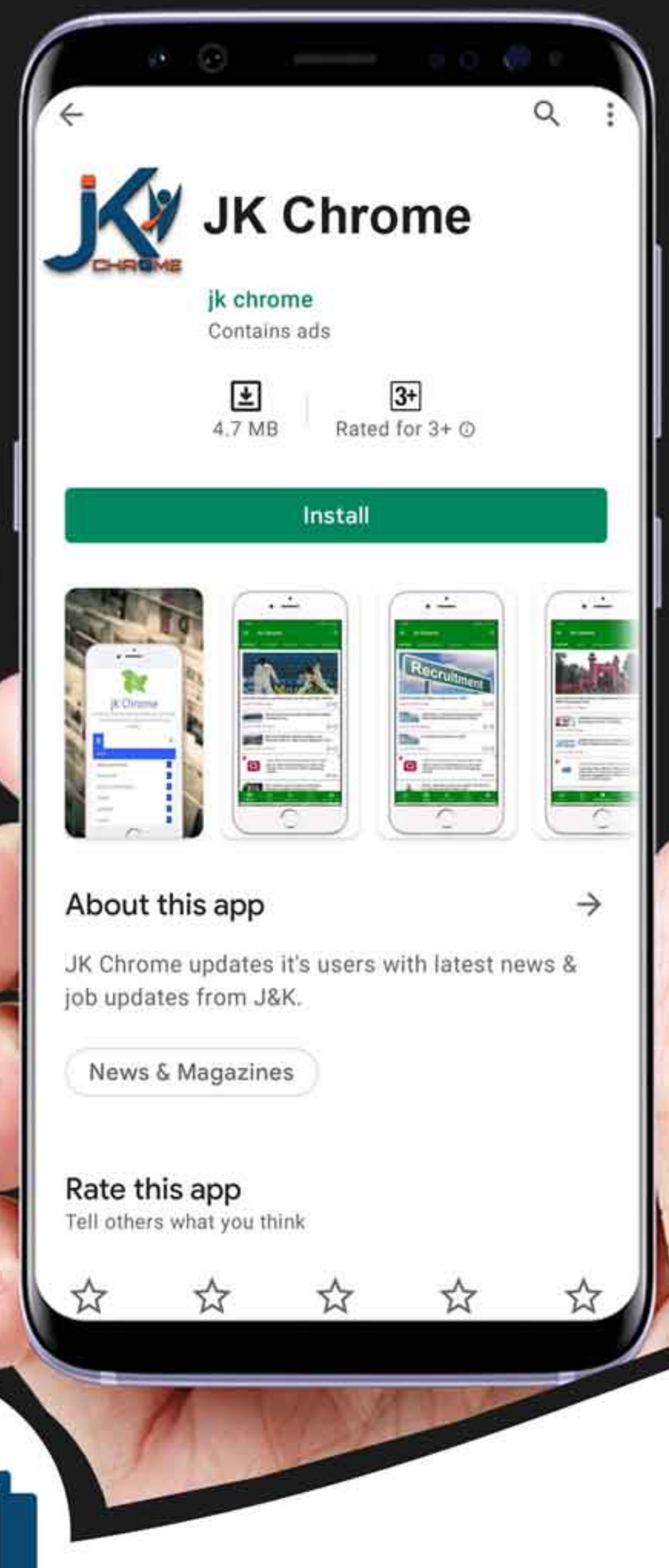

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