CHAPTER-1

REAL NUMBERS

QUESTION BANK

AVERAGE LEVEL

1. Which of the following numbers has terminating decimal expansion?

   (a) 37/45 (b) $21/2^3 5^6$ (c) 17/49 (d) $89/2^2 3^2$

2. The HCF X LCM for the numbers 50 and 20 is

   (a) 10 (b) 100 (c) 1000 (d) 50

3. The length of the diagonals of a rhombus is 24 cm and 32 cm. The perimeter of the rhombus is

   (a) 9 cm (b) 128 cm (c) 80 cm (d) 56 cm

4. $119^2 - 111^2$ is:

   (a) Prime number (b) Composite number

   (c) An odd prime number (d) an odd composite number

5. If a is an odd number, b is not divisible by 3 and LCM of a and b is p then LCM of 3a 2b is

   (a) p^2 (b) 5p (c) 6p (d) 3p

6. Euclid's division lemma states that for two positive integers a and b, there exist unique integers q and r such thata=bq+r, where r must satisfy –

   (a) $1 < r < b$ (b) $0 < r \leq b$ (c) $0 \leq r < b$ (d) $0 < r < b$

7. The decimal expansion of the rational number $31/2^2 5^1$ will terminate after:

   (a) One decimal place (b) two decimal places

   (c) Three decimal places (d) more than 3 decimal places

8. n^2-1 is divisible by 8, if n is

   (a) An integer (b) a natural number

   (c) An odd integer (d) an even integer

9. If the HCF of 65 and 117 is expressible in the form 65 m – 117, then the value of m is

   (a) 4 (b) 2 (c) 3 (d) 1

10. Which of the following is a non-terminating repeating decimal?

    (a) 35/14 (b)14/35 (c)1/7 (d)7/8

11. Given that HCF (253, 440) = 11 and LCM (253, 440) = 253 x R. The value of R is

    (a) 400 (b) 40 (c) 110 (d) 250

12. The rational number of decimal number $0.\overline{6}$ is

(a)33/50 (b)2/3 (c)111/167 (d)1/3

13. According to Euclid's division algorithm using Euclid's division lemma for any two positive integers a and b with a > b enables us to find:

(a) HCF (b) LCM (c) Decimal expansion (d) Probability

14. If $m^n = 32$ where m and n are positive integers, then the value of n^{m+n} is

(a) 2^7 (b) 5^2 (c) 4^8 (d) 5^7

15. The decimal expansion of 141/120 will terminate after how many places of decimals?

(a) 1 (b) 2 (c) 3 (d) will not terminate

16. The decimal expansion of 189/125 will terminate after:

(a) 1 place of decimal (b) 2 places of decimal

(c) 3 places of decimal (d) 4 places of decimal

17. Which of the following rational numbers have a terminating decimal expansion?

(a) 125/441 (b) 77/210 (c) 15/1600 (d) $129/2^2 5^2 7^2$

18. The least positive integer divisible by 20 and 24 is

(a) 240 (b) 480 (c) 120 (d) 960

19. If HCF (a, b) =12 and, a x b = 1800 then LCM (a, b) is

(a) 240 (b) 480 (c) 150 (d) 960

20. A rational number can be expressed as a terminating decimal if the denominator has factors:

(a) 2, 3 or 5 only (b) 2 or 3 only (c) 3 or 5 only (d) 2 or 5 only

21. Check whether 6^n can end with the digit 0 for any natural number n.

22. Show that every positive even integer is of the form 2q and that every positive odd integer is of the form 2q + 1, where q is some integer.

23. Is 7 X 11 X 13 + 11 a composite number? Justify your answer.

24. Use Euclid's division lemma to show that the cube of any positive integer is of the form 9m +1 or 9m + 8 for some positive integer m.

25. Prove that $\sqrt{7}$ is an irrational number.

26. Prove that $3+\sqrt{5}$ is an irrational number.

27. Prove that $2-3\sqrt{5}$ is an irrational number.

28. Show that square of any positive integer is of the form 4m(or) 4m + 1, where m is any integer.

29. Show that any positive even integer is of the form 4q or 4q + 2 and any positive odd integer is of the form 4q + 1 or 4q + 3 where q is any integer.

30. Prove that $2\sqrt{3}+5$ is an irrational number. Also check whether $\left(2\sqrt{3}+5\right)\cdot\left(2\sqrt{3}-5\right)$ is rational or irrational.

31. Obtain the HCF of 420 and 272 by using Euclid's division algorithm and verify the same by using fundamental theorem of arithmetic.

32. An army contingent of 104 members is to march behind an army band of 96 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?

33. Find a rational number in between $\sqrt{2}$ and $\sqrt{3}$.

34. Two positive integers “a” and “b” can be written as $a = x^3y^2$ and $b = xy^3, x, y$ are prime numbers, then find LCM (a, b).

35. Find the HCF of 1260 and 7344 using Euclid’s algorithm.

36. Show that every positive odd integer is of the form $4q+1$ or $4q+3$ where q is some integer.

37. Prove that $\sqrt{2}$ is an irrational number.

38. Prove that $2+\sqrt{3}$ is an irrational number, given that $\sqrt{3}$ is an irrational number.

39. Prove that $2+5\sqrt{3}$ is an irrational number, given that $\sqrt{3}$ is an irrational number.

40. What is the HCF of smallest prime number and the smallest composite number?

41. Given that $\sqrt{2}$ is irrational, prove that $\left(5+3\sqrt{2}\right)$ is an irrational number.

42. Find HCF and LCM of 404 and 96 and verify that $HCF \times LCM =$ Product of the two given numbers.

43. Write whether $\dfrac{2\sqrt{45}+3\sqrt{20}}{2\sqrt{5}}$ on simplification gives an irrational or a rational number.

44. Given that $\sqrt{3}$ is an irrational number, prove that $\left(2+\sqrt{3}\right)$ is an irrational number.

MODERATE LEVEL

45. For any positive integer a and 3, there exist unique integers q and r such that a = 3q + r, where r must satisfy.

(a) $0 \le r < 3$ (b) $1 < r < 3$ (c) $0 < r < 3$ (d) $0 < r \le 3$

46. $\pi - 22/7$ is

(a) a rational number (b) an irrational number

(c) a prime number (d) an even number

47. The decimal expansion of the rational number $6243/(2^3 \times 5^4)$ will terminate after:

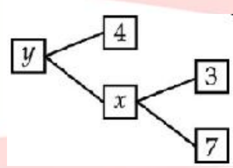
(a) 4 places of decimal (b) 3 place of decimal

(c) 2 places of decimal (d) one place of decimal

48. The HCF of the smallest composite number and the smallest prime number is

(a) 1 (b) 3 (c) 2 (d) 1

49. The values of x and y in the given figure are:



(a) $x = 10, y = 14$ (b) $x = 21, y = 84$ (c) $x = 21, y = 25$ (d) $x = 10, y = 40$

50. The product of two irrational numbers is

(a) Always a rational number

(b) Always an irrational number

(c) Sometimes a rational number, sometimes irrational

(d) Not a real number

51. The prime factors of 98 are:

(a) $2^2 \times 7$ (b) $2^3 \times 7$ (c) 2×7^2 (d) $2^2 \times 7^2$

52. The reciprocal of an irrational number is

(a) An integer (b) rational (c) a natural number (d) irrational

53. The product of two irrational numbers is

(a) Always rational (b) always irrational

(c) One (d) always a non-zero number

54. The decimal representation of a rational number $\frac{p}{q}$ is a terminating decimal only if for non-negative integer's m and n prime factors of q are of the form.

(a) $2^m \times 3^n$ (b) $3^m \times 5^n$ (c) $3^n \times 7^n$ (d) $2^m \times 5^n$

55. Can the number 6^n, n being a natural number, ends with the digit 5? Give reason.

56. Find the HCF of 255 and 867 by Euclid Division Algorithm.

57. Find the HCF of 918 and 162 using Euclid's Division Algorithm.

58. HCF and LCM of two numbers is 9 and 459 respectively. If one of the numbers is 27 then find the other number.

59. Show that the number 4^n, when n is a natural number cannot end with the digit zero for any natural number, n.

60. If $\frac{241}{4000} = \frac{241}{2^m 5^n}$, find the values of m and n where m and n are non-negative integers. Hence write its decimal expansion without actual division.

61. Write the prime factorization of 27300.

62. Write down the decimal expansion of $\frac{16}{3125}$, without actual division.

63. Explain why $3 \times 5 \times 7 + 7$ is a composite number.

64. Can two numbers have 15 as their HCF and 175 as their LCM? Give reasons.

65. Prove that $5 - 3\sqrt{2}$ is an irrational number.

66. Find HCF of 180, 252 and 324 using Euclid's Division Lemma.

70. Use Euclid's division algorithm to find the HCF of 10224 and 9648.

71. Prove that $2 + \sqrt{3}$ is an irrational number.

72. Show that 9^n can't end with 2 for any integer n.

73. Find the LCM and HCF of 15, 18 & 45 by the prime factorization method.

74. Use Euclid's lemma to show that the square of any positive integer is either of the form of 3m or 3m + 1 for some integer m.

75. Show that any positive odd integer is of the form 6q +1 or 6q + 3 where q is a positive integer.

76. Express the number $0.\overline{3178}$ in the form of rational number $\frac{a}{b}$.

77. Find HCF of 105 and 1515 by prime factorization method. Hence find their LCM also.

78. Find the LCM and HCF of 336 and 54 and verify that LCM × HCF = Product of the two numbers.

79. Prove that $\sqrt{5}$ is irrational and hence show that $3+\sqrt{5}$ is also irrational.

80. Using Euclid's division algorithm find the HCF of the number 867 and 255.

81. Two tankers contain 850 liters and 680 liters of petrol respectively. Find the maximum capacity of a container which can measure the petrol of either tanker in exact number of times.

82. Find the LCM of 2, 60&150 by fundamental theorem of arithmetic.

83. Find whether decimal expansion of $\frac{13}{64}$ is a terminating or non-terminating decimal. If it terminates, find the number of decimal places its decimal expansion has.

84. Explain whether the number $3\times5\times13\times46+23$ is a prime number or a composite number.

85. Prove that the product of any three consecutive positive integers is divisible by 6.

86. Apply Euclid's division algorithm to find HCF of numbers 4052 and 420.

87. Show that $\sqrt{3}+5$ is an irrational number.

88. Three bells toll at intervals of 12 minutes, 15 minutes and 18 minutes respectively. If they start tolling together, after what time will they next toll together?

89. If HCF of 144 and 180 is expressed in the form 13m – 3, find the value of m.

90. Show that 9^n cannot end with digit 0 for any natural number n.

91. Determine the values of p and q so that the prime factorization of 2520 is expressible as $2^3\times3^p\times q\times7$.

92. Show that $2\sqrt{2}$ is an irrational number.

93. Show that any positive odd integer is of the form $4m+1$ or $4m+3$, where m is some integer.

94. By using Euclid's algorithm, find the largest number which divides 650 and 1170.

HIGHER LEVEL

95. If the H.C.F. of two numbers is 1, then the two numbers are called:

(a) Twin primes (b) composite (c) co-primes (d) perfect numbers

96. The largest number which divides 70 and 125, leaving remainders 5 and 8 respectively, is

(a) 65 (b) 875 (c) 13 (d) 1750

97. The prime factor of $2 \times 7 \times 11 \times 17 \times 23 + 23$ is

(a) 7 (b) 11 (c) 17 (d) 23

98. The number $3^{13} - 3^{10}$ is divisible by

(a) 3, 13, 5 (b) 3, 10 (c) 2, 3, 13 (d) 2, 3, 10

99. $(-1)^n + (-1)^{8n} = 0$ where n is

(a) Any positive integer (b) any odd natural number

(c) Any even natural number (d) any negative integer

100. If two positive numbers a and b are written as $a = x^5y^2, b = x^3y^3$, where x and y are prime numbers, then the HCF (a, b) is

(a) xy (b) x^2y^2 (c) x^3y^2 (d) x^5y^3

101. $n^2 - 1$ is divisible by 8, if n is

(a) an integer (b) a natural number

(c) an odd natural number (d) an even natural number

102. If p is a prime number then LCM of p, p^2 and p^3 is

(a) p (b) p^3 (c) p^2 (d) p^6

103. Let $x = \frac{11}{2^2 \times 5^3}$ be a rational number. Then x has a decimal expansion which terminates after:

(a) four places of decimal (b) three places of decimal

(c) two places of decimal (d) one place of decimal

104. If n is a natural number, then exactly one of numbers n, n +2 and n + 4 must be a multiple of

(a) 2 (b) 3 (c) 5 (d) 7

105. Prove that $\sqrt{3}+\sqrt{5}$ is irrational.

106. The HCF of 65 and 117 is expressible in the form 65m – 117. Find the value of m. Also find the LCM of 65 and 117 using prime factorization method.

107. Show that one and only one out of n, n + 2 or n + 4 is divisible by 3, where n is any positive integer.

108. Find the value of $(-1)^{n}+(-1)^{2n}+(-1)^{2n+1}+(-1)^{4n+2}$, where n is any positive odd integer.

109. Show that any positive odd integer is of the form 8q+ 1 or 8q + 3 or 8q + 7 where q is some integer.

110. Three bells toll at intervals of 9, 12, 15 minutes respectively. If they start tolling together, after what time will they next toll together?

111. Sita takes 35 seconds to pack and label a box. For Ram, the same job takes 42 seconds and for Geeta, it takes 28 seconds. If they all start using labeling machines at the same time, after how many seconds will they be using the labeling machines together?

112. Two tankers contain 850 liters and 680 liters of petrol. Find the maximum capacity of a container which can measure the petrol of each tanker in exact number of times.

113. The length, breadth and height of a room are 8m 25 cm, 6m 75 cm and 4 m 50 cm respectively. Find the length of the longest rod that can measure the three dimensions of the room exactly.

114. In a school, the duration of a period in junior section is 40 minutes and senior section is 1 hour. If the first bell for each section rings at 9.00 a.m., when will the two bells ring together again?

115. In a school there are two sections A and B of class X. There are 48 students in section A and 60 students in section B. Determine the least number of books required for the library of the school so that the books can be distributed equally among all students of each section.

116. By using Euclid's algorithm, find the largest number which divides 650 and 1170.

117. Prove that $\frac{2\sqrt{3}}{5}$ is an irrational number.

118. Find the LCM and HCF of 12, 72 and 120 using prime factorization. Also show that $\text{HCF} \times \text{LCM} \neq$ Product of three given numbers.

119. Prove that $n^2 - n$ is divisible by 2 for every positive integer n.

120. Using Euclid's division algorithm, find whether the pair of numbers 847, 2160 are co-primes or not.

121. Show that reciprocal of $\sqrt{3}\,\mathrm{H}\,2\sqrt{2}$ is an irrational number.

122. Find HCF of 378, 180 and 420 by prime factorization method. Is $\text{HCF}\,\text{ò}\,\text{LCM}$ of three numbers equal to the product of the three numbers?

123. Find the HCF of 255 and 867 by Euclid's division algorithm.

124. Find the HCF $(865, 255)$ using Euclid's division lemma.

125. Find HCF of 65 and 117 and find a pair of integral values of m and n such that HCF = $65m\,\mathrm{H}\,117m$.

126. By using Euclid's algorithm, find the largest number which divides 650 and 1170.

127. If $\frac{241}{4000}\,\mathrm{Z}\,\frac{241}{2^m 5^n}$, find the values of m and n where m and n are non-negative integers. Hence, write its decimal expansion without actual division.

128. Express the number $0.\overline{3178}$ in the form of rational number $\frac{a}{b}$.

129. Using Euclid's division algorithm, find whether the pair of number 847,2160 are co-primes or not.

130. The LCM of two numbers is 14 times their HCF. The sum of LCM and HCF is 600. If one number is 280, then find the other number.

131. Prove that $15\,\mathrm{H}\,17\sqrt{3}$ is an irrational number.

132. Find the LCM and HCF of 120 and 144 by using Fundamental Theorem of Arithmetic.

133. An army contingent of 1000 members is to march behind an army band of 56 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?

134. Show that any positive odd integer is of the form $4q\,\mathrm{H}\,1$ or $4q\,\mathrm{H}\,3$ where q is a positive integer.

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