Date: 28/9/2021

Q1. Use Euclid's division algorithm to find the HCF of 210 and 55.

Q2. State Euclid's division lemma.

Q3. State Dundamental Theorem of Arithmetic.

Q4. What is an algorithm?

Q5. What is a lemma?

Q6. Express the following positive integer as the product of its prime factors

Q7. Find the HCF and LCM of 90 and 144 by the prime factorisation method.

Q8. Find the HCF and LCM of 144, 180 and 192 by the prime factorisation method.

Q9. Can two numbers have 16 as their HCF and 380 as their LCM? Give reason.

Q10. The HCF of two numbers is 145 and their LCM is 2175. If one number is 725, find the other.

Q11. Write the exponent of 2 in the prime factorization of 144.

Q12. Write the sum of the exponents of prime factors in the prime factorization of 98.

Q13. If theprime factorization of a natural number n is $2^3 \times 3^2 \times 5^2 \times 7$, write the number of consecutive zeros in n.

Q14. In the product of two numbers is 1080 and their HCF is 30, find their LCM.

Q15. What is the total number of factors of a prime number?

Q16. For what value of n, $2^n \times 5^n$ ends in 5.

Q17. What is the HCF of the smallest composite number and the smallest prime number?

Q18. If a and b are relatively prime numbers, then what is their HCF?

Q19. If a and b are relatively prime numbers, then what is their LCM?

Q20. Without actually performing the long division, state whether the following rational numbers will have a terminating decimal expansion or a non-terminating repeating decimal expansion.

(i) $\frac{23}{8}$ (ii) $\frac{125}{441}$ (iii) $\frac{129}{2^2 \times 5^7 \times 7^{17}}$

Q21. Write down the decimal expansions of the following rational numbers by writing their denominators in the form $2^m \times 5^n$, where m, n are non-negative integers.

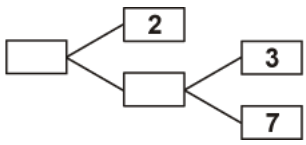
(i) $\frac{3}{8}$ (ii) $\frac{13}{125}$ (iii) $\frac{7}{80}$ (iv) $\frac{14588}{625}$

Q22. Write the condition to be satisfied by q so that a rational number $\frac{p}{q}$ has a non-terminating decimal expansion.

Q23. Write the condition to be satisfied by q so that a rational number $\frac{p}{q}$ has a terminating decimal expansion.

Q24. The decimal expansion of the rational number $\frac{43}{2^4 \times 5^3}$ will terminate after how many places of decimals?

Q25. Complete the missing entries in the following factor tree.



Q26. Has the rational number $\frac{441}{2^4 \times 5^7 \times 7^2}$ a terminating or a nonterminating decimal representation?

Q27. Write whether $\frac{2\sqrt{45} + 3\sqrt{20}}{2\sqrt{5}}$ on simplification gives a rational or an irrational number.

Q28. The exponent of 2 in the prime factorisation of 144, is

(a) 4 (b) 5 (c) 6 (d) 3

Q29. The LCM of two numbers is 1200. Which of the following cannot be their HCF?

(a) 600 (b) 500 (c) 400 (d) 200

Q30. If $n = 2^3 \times 3^4 \times 5^4 \times 7$, then the number of consecutive zeros in n, where n is a natural number, is

(a) 2 (b) 3 (c) 4 (d) 7

Q31. The sum of the exponents of the prime factors in the prime factorisation of 196, is

(a) 2 (b) 3 (c) 4 (d) 6

Q32. The number of decimal places after which the decimal expansion of the rational number $\frac{23}{2^2 \times 5}$ will terminate, is

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

Q33. If the LCM of a and 18 is 36 and the HCF of a and 18 is 2, then a =

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

Q34. If two positive integers m and n are expressible in the form $m = pq^3$ and $n = p^3q^2$, wehere p, q are prime numbers, then HCF (m, n) =

(a) pq (b) pq^2 (c) p^3q^3 (d) p^2q^3

Q35. If HCF (26, 169) = 13, then LCM (26, 69) =

(a) 26 (b) 52 (c) 338 (d) 13

Q36. If $a = 2^3 \times 3$, $b = 2 \times 3 \times 5$, $c = 3^n \times 5$ and LCM (a, b, c) $= 2^3 \times 3^2 \times 5$, then n =

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

Q37. The decimal expansion of the rational number $\frac{14587}{1250}$ will terminate after

(a) one decimal place (b) two decimal place
(c) three decimal place (d) four decimal place

Q38. If p and q are co-prime numbers, then p^2 and q^2 are:

(a) co-prime (b) not co-prime (c) even (d) odd

Q39. Which of the following rational numbers have terminating decimal?

(a) $\frac{16}{225}$ (b) $\frac{5}{18}$ (c) $\frac{2}{21}$ (d) $\frac{7}{250}$

(a) (i) and (ii) (b) (ii) and (iii) (c) (i) and (iii) (d) (i) and (iv)

Q40. The smallest number by which $\sqrt{27}$ should be multiplied so as to get a rational number is

(a) $\sqrt{27}$ (b) $3\sqrt{3}$ (c) $\sqrt{3}$ (d) 3

Q41. If 3 isthe least prime factor of number a and 7 is the least prime factor of number b, then the least prime factor of $a + b$, is

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

Q42. 3.27 is

(a) an integer (b) a rational number

(c) a natural number (d) an irrational number

Q43. The smallest rational number by which $\frac{1}{3}$ should be multiplied so that its decimal expansion terminates after one place of decimal, is

(a) $\frac{3}{10}$ (b) $\frac{1}{10}$ (c) 3 (d) $\frac{3}{100}$

Q44. If n is any natural number, then $6^n - 5^n$ always ends with

(a) 1 (b) 3 (c) 5 (d) 7

[Hint: For any $n \in N$, 6^n and 5^n end with 6 and 5 respectively. Therefore, $6^n - 5^n$ always ends with $6 - 5 = 1$.]

Q45. Check whether 15^n can end with the digit 0 for any natural number n.

Q46. What is the smallest number that, when divided by 35, 56 and 91 leaves remainders of 7 in each case?

Q47. Find the smallest number which leaves remainders 8 and 12 when divided by 28 and 32 respectively.

Q48. Find the greatest number of 6 digits exactly divisible by 24, 15 and 36.

Q49. Find the smallest number which when increased by 17 is exactly divisible by both 520 and 468.

Q50. Find the largest positive integer that will divide 398, 436 and 542 leaving remainders 7, 11 and 15 respectively.

Q51. Two tankers contain 850 litres and 680 litres of petrol respectively. Find the maximum capacity of a container which can measure the petrol of either tanker in exact number of times.

Q52. Find the largest number which divides 245 and 1029 leaving remainder 5 in each case.

Q53. Find the largest number that divides 2053 and 967 and leaves a remainder of 5 and 7 respectively

Q54. If the HCF of 408 and 1032 is expressible in the form $1032m - 408 \times 5$, find m.

Q55. Find the greatest number which divides 2011 and 2623 leaving remainders 9 and 5 respectively.

Q56. Find the greatest number that divide 445, 572 and 699 leaving remainders 4, 5 and 6 respectively.

Q57. Find the largest number which exactly divides 280 and 1245 leaving remainders 4 and 3, respectively.

Q58. Find the greatest number which divides 285 and 1239 leaving remainders 9 and 7 respectively.

Q59. Find the largest number which divides 615 and 963 leaving remainder 6 in each case.

Q60. Show that any positive odd integer is of the form $4q + 1$ or $4q + 3$, where q is some integer.

Q61. If the HCF of 210 and 55 is expressible in the form $210 \times 5 + 55y$, find y.

Q62. Find the HCF of 65 and 117 and express it in the form $65m + 117n$.

Q63. Use Euclid's division algorithm to find the HCF of 4052 and 12576.

Q64. Prove that the product of two consecutive positive integers is divisible by 2.

Q65. Show that any positive integer is of the form $3q$ or $3q + 1$ or $3q + 2$ for some integer q.

Q66. Show that $n^2 - 1$ is divisible by 8, if n is an odd positive integer.

Q67. Prove that $n^2 - n$ is divisible by 2 for every positive integer n.

Q68. Prove that if x and y are odd positive integers, then $x^2 - y^2$ is even but not divisible by 4.

Q69. Prove that one of every three consecutive positive integers is divisible by 3.

Q70. Prove that the square of any positive integer is of th form $3m$ or $3m + 1$ but not of the form $3m + 2$.

Q71. Show that the square of an odd positive integer is of the form $8q + 1$, for some inter q.

Q72. In a seminar, the number of participants in Hindi, English and Mathematics are 60, 84 and 108, respectively. Find the minimum number of rooms required if in each room the same number of participants are to be seated and all of them being in the same subject.

Q73. Find the largest number that will divide 398, 436 and 542 leaving remainders 7, 11 and 15 respectively.

Q74. What is the largest number that divides 626, 3127 and 15628 and leaves remainders of 1, 2, and 3 respectively?

Q75. Express the HCF of 468 and 222 as $469x + 222y$ where x, y are integers in two different ways.

Q76. If d is the HCF of 56 and 72, find x, y satisfying $d = 56x + 72y$. Also, show that x and y are not unique.

Q77. Find the HCF of 81 and 237 and express.

Q78. Three sets of English, Hindi and Mathematics books have to be stacked in such a way that all the books are stored topic wise and the height of each stack is the same. The number of English books is 96, the number of Hindi books is 240 and the number of Mathematics books is 336. Assuming that the books are of the same thickness, determine the number of stacks of English, Hindi and Mathematics books.

Q79. During a sale, colour pencils were being sold in packs of 24 each and crayons in packs of 32 each. If you want full packs of both and the same number of pencils and crayons, how many f each would you need to buy?

Q80. A merchant has 120 litres of oil of one kind, 180 litres of another kind and 240 litres of third kind. He wants to sell the oil by filling the three kinds of oil in tins of equal capacity. What should be the greatest capacity of such a tin?

Q81. 144 cartons of Coke Cans and 90 cartons of Pepsi Cans are to be stacked in a Canteen. If each stack is of the same height and is to contain cartons of the same drink, what would be the greatest number of cartons each stack would have?

Q82. Three sets of English, Hindi and Mathematics books have to be stacked in such a way that all tehe books are stored topic wise and the height of wach stack is the same. The number of English books is 96, the number of Hindi books is 240 and the number of Mathematics books is 336. Assuming that the books are of the same thickness, determine the number of stacks of English, Hindi and Mathematics books.

Q83. In a seminar, the number of participants in Hindi, English and Mathematics are 60, 84 and 108 respectively. Find the minimum number of rooms required if in each room the same number participants are to be seated and al of them being in the same subject.

Q84. The length, breadth and height of a room are 8 m 25 m, 6 m 75 cm and 4 m 50 cm, respectively. Determine the longest rod which can measure the three dimensions of the room exactly.

Q85. 15 pastries and 12 biscuit packets have been donated for a school fete. These are to be packed in several smaller identical boxes with the same number of pastries and biscuit packets in each. How many biscuit packets and how many pastries will each box contain?

Q86. A mason has to fit a bathroom with square marble tiles of the largest possible size. The size of the bathroom is 10 ft. by 8 ft. What would be the size in inches of the tile required that has to be cut and how many such tiles are required?

Q87. Two brands of chocolates are available in packs of 24 and 15 respectively. If I need to buy an equal number of chocolates of both kinds, what is the least number of boxes of each kind I would need to buy?

Q88. Show that $2 - \sqrt{3}$ is an irrational number.

Q89. Prove that $\sqrt{2} + \sqrt{5}$ is irrational.

Q90. Prove that $\sqrt{5}$ is an irrational number.

Q91. Prove that $\sqrt{5} + \sqrt{3}$ is irrational.

Q92. Prove that $\sqrt{3} + \sqrt{4}$ is an irrational number.

Q93. Prove that following numbers are irrationals: $\frac{3}{2\sqrt{5}}$.

Q94. Show that the following numbers are irrational: $3 - \sqrt{5}$.

Q95. Show that the following numbers are irrational: $7\sqrt{5}$.

Q96. Show that the following numbers are irrational: $\frac{1}{\sqrt{2}}$.

Q97. In a morning wolk three persons step off together, their steps measure 80 cm, 85 cm and 90 cm respectively. What is the minimum distance each should walk so that he can cover the distance in complete steps?

Q98. A rectangular courtyard is 18 m 72 cm and 13 m 20 cm broad. It is to be payed with square tiles of the same size. Find the least possible number of such tiles.

Q99. There is a circular path around a sports field. Priya takes 18 minutes to drive one round of the field, while Ravish takes 12 minutes for the same. Suppose they both start at the same point and at the same time, and go in the same direction. After how many minutes will they meet again at the starting point?

Q100 Show that $3 - \sqrt{2}$ is an irrational number.

Q101 Prove that $2\sqrt{3} - 1$ is an irrational number.

Q102 Prove that $2 - 3\sqrt{5}$ is an irrational number.

Q103 Prove that $5 - 2\sqrt{3}$ is an irrational number.

Q104 Prove that $4 - 5\sqrt{2}$ is an irrational number.

Q105 Show that one and only one out of n, $n + 2$ or $n + 4$ is divisible by 3, where n is any positive integer.

Q106 For any positive integer n, prove than $n^3 - n$ divisible by 6.

Q107 Prove that the square of any positive integer is of the form $5q$, $5q + 1$, $5q + 4$ for some integer q.

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S1. 5.

S2. Explain yourself.

S3. Explain yourself.

S4. Explain yourself.

S5. Explain yourself.

S6. $[17 \times 19 \times 23]$.

S7. HCF = 18, LCM = 720.

S8. HCF = 12, LCM = 2880.

S9. No.

S10. 435.

S11. 4.

S12. 3.

S13. 2.

S14. 36.

S15. 2.

S16. No values of n.

S17. 2.

S18. 1

S19. ab.

S20. (i) Terminating (ii) Non-terminating repeating (iii) Non-terminating repeating

S21. (i) 0.375 (ii) 0.104 (iii) 0.0875 (v) 23.3408

S22. The prime factorization of q is not of the form $2^m \times 5^n$, where m, n are non-negative integers.

S23. The prime factorization of q must be of the form $2^m \times 5^n$, where m, n are non-negative integers.

S24. 4.

S25. 42, 21.

S26. Non-terminating.

S27. Rational number.

S28. **(a)** 4.

S29. **(b)** 500.

S30. **(b)** 3.

S31. **(c)** 4.

S32. **(b)** 2.

S33. **(c)** 4.

S34. **(b)** pq^2.

S35. **(c)** 338.

S36. **(b)** 2.

S37. **(d)** Four decimal place.

S38. **(a)** Co-prime.

S39. **(d)** $\frac{7}{250}$.

S40. **(c)** $\sqrt{3}$.

S41. **(a)** 2.

S42. **(b)** a rational number.

S43. **(a)** $\frac{3}{10}$.

S44. **(a)** 1.

S45. No values of n.

S46. 3647.

S47. 204.

S48. 999720.

S49. 4663.

S50. Required number = 17.

S51. 170 litres.

S52. Required number = 16.

S53. Required number = 64.

S54. 2.

S55. 154.

S56. 63.

S57. 138.

S58. 138.

S59. 87.

S60. Proved.

S61. – 19.

S62. HCF = 13; $m = 2$; $n = -1$.

S63. 4.

S64. Proved.

S65. Proved.

S66. Proved.

S67. Proved.

S68. Proved.

S69. Proved.

S70. Proved.

S71. Proved.

S72. 252, 21.

S73. Required number = 17.

S74. 625.

S75. $6 = 468 \times -9 + 222 \times 19$, $6 = 468 \times 213 + 222 \times (-449)$.

S76. $d = 8$, $x = -68$, $y = 53$.

S77. 3.

S78. 48.

S79. 4 packets of colour pencils, 3 packets of crayons.

S80. 60 litres.

S81. 18.

S82. [2, 5, 7]

S83. [12, 21]

S84. 75. cm

S85. 5 biscuit packets, 5 pastries.

S86. 24 Inches, 20 tiles.

S87. 5 of first kind, 8 of second kind.

S88. Proved.

S89. Proved.

S90. Proved.

S91. Proved.

S92. Proved.

S93. Proved.

S94. Proved.

S95. Proved.

S96. Proved.

S97. 122 m 40 cm.

S98. 4290.

S99. 288.

S100. Proved.

S101. Proved.

S102. Proved.

S103. Proved.

S104. Proved.

S105. Proved.

S106. Proved.

S107. Proved.