1 Real Numbers

Multiple Choice Questions (MCQs)

DIRECTIONS : *This section contains multiple choice questions. Each question has 4 choices (a), (b), (c) and (d) out of which only one is correct.*

1. What is the largest number that divides 70 and 125, leaving remainders 5 and 8 respectively?

(a) 13 (b) 9
(c) 3 (d) 585

2. What is the largest number that divides 245 and 1029, leaving remainder 5 in each case?

(a) 15 (b) 16
(c) 9 (d) 5

3. A class of 20 boys and 15 girls is divided into n groups so that each group has x boys and y girls. Values of x, y and n respectively are

(a) 3, 4 and 8 (b) 4, 3 and 6
(c) 4, 3 and 7 (d) 7, 4 and 3

4. If p, q are two consecutive natural numbers, then H.C.F. (p, q) is

(a) p (b) q
(c) 1 (d) pq

5. Given that L.C.M. (91, 26) = 182, then H.C.F. (91, 26) is

(a) 13 (b) 26
(c) 17 (d) 9

6. Which of the following statement is true?

(a) Every point on the number line represents a rational number.
(b) Irrational numbers cannot be represented by points on the number line.
(c) $\frac{22}{7}$ is a rational number.
(d) None of these.

7. The sum of exponents of prime factors in the prime-factorisation of 196 is

(a) 3 (b) 4
(c) 5 (d) 2

8. When 2^{256} is divided by 17, then remainder would be

(a) 1 (b) 16
(c) 14 (d) None of these

9. The sum of three non-zero prime numbers is 100. One of them exceeds the other by 36. Then, the largest number is

(a) 73 (b) 91
(c) 67 (d) 57

10. The rational number of the form $\frac{p}{q}$, $q \neq 0$, p and q are positive integers , which represents $0.1\overline{34}$ i.e., (0.1343434....) is

(a) $\frac{134}{999}$ (b) $\frac{134}{990}$
(c) $\frac{133}{999}$ (d) $\frac{133}{990}$

11. The least number which is a perfect square and is divisible by each of 16, 20 and 24 is

(a) 240 (b) 1600
(c) 2400 (d) 3600

12. If n is an even natural number, then the largest natural number by which $n(n + 1)(n + 2)$ is divisible is

(a) 6 (b) 8
(c) 12 (d) 24

13. The least number which when divided by 15, leaves a remainder of 5, when divided by 25, leaves a remainder of 15 and when divided by 35, leaves a remainder of 25, is

(a) 515 (b) 525
(c) 1040 (d) 1050

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

(a) 2 and 3

(b) 3 and 10

(c) 2, 3 and 10

(d) 2, 3 and 13

15. A number lies between 300 and 400. If the number is added to the number formed by reversing the digits, the sum is 888 and if the unit's digit and the ten's digit change places, the new number exceeds the original number by 9. Then, the number is

(a) 339 (b) 341

(c) 378 (d) 345

16. Which of the following will have a terminating decimal expansion?

(a) $\frac{77}{210}$ (b) $\frac{23}{30}$

(c) $\frac{125}{441}$ (d) $\frac{23}{8}$

17. I. The L.C.M. of x and 18 is 36.

II. The H.C.F. of x and 18 is 2.

What is the number x ?

(a) 1 (b) 2

(c) 3 (d) 4

18. If $a = 2^3 \times 3$, $b = 2 \times 3 \times 5$, $c = 3^n \times 5$ and

L.C.M. $(a, b, c) = 2^3 \times 3^2 \times 5$, then $n =$

(a) 1 (b) 2

(c) 3 (d) 4

19. If p_1 and p_2 are two odd prime numbers such that $p_1 > p_2$, then $p_1^2 - p_2^2$ is

(a) an even number

(b) an odd number

(c) an odd prime number

(d) a prime number

20. When a natural number x is divided by 5, the remainder is 2. When a natural number y is divided by 5, the remainder is 4. The remainder is z when x + y is divided by 5. The value of $\frac{2z-5}{3}$ is

(a) –1 (b) 1

(c) –2 (d) 2

21. The largest non-negative integer k such that 24^k divides 13! is

(a) 2 (b) 3

(c) 4 (d) 5

22. On dividing a natural number by 13, the remainder is 3 and on dividing the same number by 21, the remainder is 11. If the number lies between 500 and 600, then the remainder on dividing the number by 19 is

(a) 4 (b) 6

(c) 9 (d) 13

23. Let $a_1, a_2,..., a_{100}$ be non-zero real numbers such that $a_1 + a_2 + ...+ a_{100} = 0$

Then,

(a) $\sum_{i=1}^{100} a_i 2^{a_i} > 0$ and $\sum_{i=1}^{100} a_i 2^{-a_i} < 0$

(b) $\sum_{i=1}^{100} a_i 2^{a_i} \geq 0$ and $\sum_{i=1}^{100} a_i 2^{-a_i} \geq 0$

(c) $\sum_{i=1}^{100} a_i 2^{a_i} \leq 0$ and $\sum_{i=1}^{100} a_i 2^{-a_i} \leq 0$

(d) The sign of $\sum_{i=1}^{100} a_i 2^{a_i}$ or $\sum_{i=1}^{100} a_i 2^{-a_i}$ depends on the choice of a_i's

24. The value of $0.\overline{235}$ is :

(a) $\frac{233}{900}$ (b) $\frac{233}{990}$

(c) $\frac{235}{999}$ (d) $\frac{235}{990}$

25. Consider the following statements: For any integer n,

I. $n^2 + 3$ is never divisible by 17.

II. $n^2 + 4$ is never divisible by 17.

Then,

(a) both I and II are true

(b) both I and II are false

(c) I is false and II is true

(d) I is true and II is false

26. Given that $\frac{1}{7} = 0.\overline{142857}$, which is a repeating decimal having six different digits. If x is the sum of such first three positive integers n such that $\frac{1}{n} = 0.\overline{abcdef}$, where a, b, c, d, e and f are different digits, then the value of x is

(a) 20 (b) 21

(c) 41 (d) 42

27. If $m = n^2 - n$, where n is an integer, then $m^2 - 2m$ is divisible by

(a) 20 (b) 24

(c) 30 (d) 16

28. The unit digit in the expression $55^{725} + 73^{5810} + 22^{853}$ is
(a) 0 (b) 4
(c) 5 (d) 6

29. For some integer *m*, every even integer is of the form
(a) m (b) $m + 1$
(c) $2m$ (d) $2m + 1$

30. For some integer *q*, every odd integer is of the form
(a) q (b) $q + 1$
(c) $2q$ (d) $2q + 1$

31. The decimal expansion of the rational number $\frac{33}{2^2.5}$ will terminate after
(a) one decimal place
(b) two decimal places
(c) three decimal places
(d) more than 3 decimal places

32. Product of two co-prime numbers is 117. Their L.C.M. should be
(a) 1
(b) 117
(c) equal to their H.C.F.
(d) Lies between 1 to 117

33. Which of the following statement(s) is/are always true?
(a) The sum of two distinct irrational numbers is rational.
(b) The rationalising factor of a number is unique.
(c) Every irrational number is a surd.
(d) None of these

34. Which of the following statement(s) is/are not correct?
(a) $\frac{7^3}{5^4}$ is a non-terminating repeating decimal.
(b) If $a = 2+\sqrt{3}$ and $b = \sqrt{2}-\sqrt{3}$, then $a + b$ is irrational.
(c) If 19 divides a^3, then 19 divides a, where *a* is a positive integer.
(d) Product of L.C.M. and H.C.F. of 25 and 625 is 15625.

35. The product of unit digit in $(7^{95} – 3^{58})$ and $(7^{95} + 3^{58})$ is
(a) 8
(b) lies between 3 and 7
(c) 6
(d) lies between 3 and 6

36. Which of the following statement(s) is/are not correct?
(a) Every integer is a rational number.
(b) The sum of a rational number and an irrational number is an irrational number.
(c) Every real number is rational.
(d) Every point on a number line is associated with a real number.

37. Which of the following statement(s) is/are not correct?
(a) There are infinitely many even primes.
(b) Let '*a*' be a positive integer and *p* be a prime number such that a^2 is divisible by *p*, then *a* is divisible by *p*.
(c) Every positive integer different from 1 can be expressed as a product of non-negative power of 2 and an odd number.
(d) If '*p*' is a positive prime, then $\sqrt{p}$ is an irrational number.

Case/Passage Based Questions

DIRECTIONS : *Study the given Case/Passage and answer the following questions.*

Case/Passage-I

To enhance the reading skills of grade X students, the school nominates you and two of your friends to set up a class library. There are two sections-section A and section B of grade X. There are 32 students in section A and 36 students in section B.

[From CBSE Question Bank-2021]

38. What is the minimum number of books you will acquire for the class library, so that they can be distributed equally among students of Section A or Section B?
(a) 144 (b) 128 (c) 288 (d) 272

39. If the product of two positive integers is equal to the product of their HCF and LCM is true then, the HCF (32, 36) is
(a) 2 (b) 4 (c) 6 (d) 8

40. 36 can be expressed as a product of its primes as
(a) $2^2 \times 3^2$ (b) $2^1 \times 3^3$
(c) $2^3 \times 3^1$ (d) $2^0 \times 3^0$

41. $7\times 11 \times 13 \times 15 + 15$ is a
(a) Prime number
(b) Composite number
(c) Neither prime nor composite
(d) None of the above

42. If p and q are positive integers such that p = ab^2 and q = a^2b, where a, b are prime numbers, then the LCM (p, q) is

(a) ab (b) a^2b^2 (c) a^3b^2 (d) a^3b^3

Case/Passage-II

A seminar is being conducted by an Educational Organisation, where the participants will be educators of different subjects. The number of participants in Hindi, English and Mathematics are 60, 84 and 108 respectively.

[From CBSE Question Bank-2021]

43. In each room the same number of participants are to be seated and all of them being in the same subject, hence maximum number participants that can accommodated in each room are

(a) 14 (b) 12 (c) 16 (d) 18

44. What is the minimum number of rooms required during the event?

(a) 11 (b) 31 (c) 41 (d) 21

45. The LCM of 60, 84 and 108 is

(a) 3780 (b) 3680 (c) 4780 (d) 4680

46. The product of HCF and LCM of 60,84 and 108 is

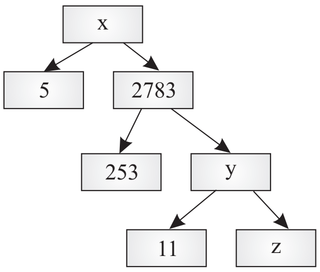
(a) 55360 (b) 35360 (c) 45500 (d) 45360

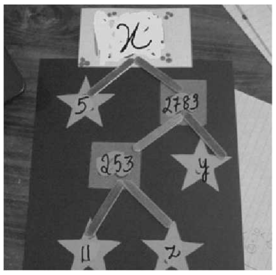
47. 108 can be expressed as a product of its primes as

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

Case/Passage-III

A Mathematics exhibition is being conducted in your school and one of your friendsis making a model of a factor tree. He has some difficulty and asks for your help in completing a quiz for the audience.





[From CBSE Question Bank-2021]

Observe the following factor tree and answer the following:

48. What will be the value of x?

(a) 15005 (b) 13915
(c) 56920 (d) 17429

49. What will be the value of y?

(a) 23 (b) 22 (c) 11 (d) 19

50. What will be the value of z?

(a) 22 (b) 23 (c) 17 (d) 19

51. According to Fundamental Theorem of Arithmetic 13915 is a

(a) Composite number
(b) Prime number
(c) Neither prime nor composite
(d) Even number

52. The prime factorisation of 13915 is

(a) $5 \times 11^3 \times 13^2$ (b) $5 \times 11^3 \times 23^2$
(c) $5 \times 11^2 \times 23$ (d) $5 \times 11^2 \times 13^2$

Assertion & Reason

DIRECTIONS : *Each of these questions contains an Assertion followed by Reason. Read them carefully and answer the question on the basis of following options. You have to select the one that best describes the two statements.*

(a) If both **Assertion** and **Reason** are **correct** and Reason is the **correct explanation** of Assertion.

(b) If both **Assertion** and **Reason** are correct, but Reason is **not the correct explanation** of Assertion.

(c) If **Assertion** is **correct** but **Reason** is **incorrect**.

(d) If **Assertion** is **incorrect** but **Reason** is **correct**.

53. **Assertion :** $\frac{13}{3125}$ is a terminating decimal fraction.

Reason : If $q = 2^n.5^m$ where n, m are non-negative integers, then $\frac{p}{q}$ is a terminating decimal fraction.

54. **Assertion :** Denominator of 34.12345. When expressed in the form $\frac{p}{q}, q \neq 0$, is of the form $2^m \times 5^n$, where m, n are non-negative integers.

Reason : 34.12345 is a terminating decimal fraction.

55. **Assertion :** The H.C.F. of two numbers is 16 and their product is 3072. Then, their L.C.M = 162.

Reason : If a, b are two positive integers, then H.C.F × L.C.M. = $a \times b$.

56. **Assertion :** 2 is a rational number.

Reason : The square roots of all positive integers are irrationals.

57. **Assertion :** If L.C.M. $\{p, q\} = 30$ and H.C.F $\{p, q\} = 5$, then $p.q = 150$.

Reason : L.C.M. of (a, b) × H.C.F of $(a, b) = a.b$.

58. **Assertion :** $n^2 - n$ is divisible by 2 for every positive integer.

Reason : $\sqrt{2}$ is not a rational number.

59. **Assertion :** $n^2 + n$ is divisible by 2 for every positive integer n.

Reason : If x and y are odd positive integers, from $x^2 + y^2$ is divisible by 4.

Match the Following

DIRECTIONS : *Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in column-I have to be matched with statements (p, q, r, s) in column-II.*

60.

	Column-I		**Column-II**
(A)	Irrational number is always	(p)	rational number
(B)	Rational number is always	(q)	irrational number
(C)	$\sqrt[3]{6}$ is not a	(r)	non-terminating, non-repeating
(D)	2 $\sqrt{2}$ is an	(s)	terminating decimal

61.

	Column-I		**Column-II**
(A)	H.C.F of the smallest composite number and the smallest prime number	(p)	6
(B)	H.C.F of 336 and 54	(q)	5
(C)	H.C.F of 475 and 495	(r)	2

62.

	Column-I		**Column-II**
(A)	$\dfrac{551}{2^3 \times 5^6 \times 7^9}$	(p)	a prime number
(B)	Product of $(\sqrt{5}-\sqrt{3})$ and $(\sqrt{5}+\sqrt{3})$ is	(q)	is an irrational number
(C)	$\sqrt{5}-4$	(r)	is a terminating decimal representation
(D)	$\dfrac{422}{2^3 \times 5^4}$	(s)	is a non-terminating but repeating decimal representation

Fill in the Blanks

DIRECTIONS : *Complete the following statements with an appropriate word / term to be filled in the blank space(s).*

63. $\sqrt{5}$ is a/ an .... number.

64. $\dfrac{1}{\sqrt{2}}$ is a/ an .... number.

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

66. $7\sqrt{5}$ is a/ an .... number.

67. $6+\sqrt{2}$ is a/ an .... number.

68. An .... is a series of well defined steps which gives a procedure for solving a type of problem.

69. An........... is a proven statement used for proving another statement.

70. L.C.M. of 96 and 404 is ....

71. H.C.F. of 6, 72 and 120 is ....

72. 156 as a product of its prime factors ....

73. $\dfrac{35}{50}$ is a .... decimal expansion.

True / False

DIRECTIONS : *Read the following statements and write your answer as true or false.*

74. Given positive integers a and b, there exist whole numbers q and r satisfying $a = bq + r$, $0 \leq r < b$.

75. Every composite number can be expressed (factorised) as a product of primes and this factorisation is unique, apart from the order in which the prime factors occur.

76. $\sqrt{2}$ and $\sqrt{3}$ are irrational numbers.

77. If $x = p/q$ be a rational number, such that the prime factorisation of q is of the form $2^n 5^m$, where n, m are non-negative integers. Then x has a decimal expansion which is terminating.

78. Any positive odd integer is of the form $6q + 1$ or $6q + 3$ or $6q + 5$, where q is some integer.

79. The quotient of two integers is always a rational number.

80. 1/0 is not rational.

81. The number of irrational numbers between 15 and 18 is infinite.

82. Every fraction is a rational number.

ANSWER KEY & SOLUTIONS

1. **(a)** Required number = H.C.F. {(70 – 5), (125 – 8)}
= H.C.F. (65, 117) = 13.

2. **(b)** Required number = H.C.F.{(245 – 5), (1029 – 5)}
= H.C.F. (240, 1024) = 16.

3. **(c)** H.C.F. of 20 and 15 = 5
So, 5 students are in each group.
$\therefore \quad n = \frac{20+15}{5} = \frac{35}{5} = 7$
Hence, x = 4, y = 3 and n = 7

4. **(c)** 1

5. **(a)** H.C.F. (91, 126) = $\frac{91\times126}{\text{L.C.M.}(91, 126)} = \frac{91\times126}{182} = 13$

6. **(d)** All the given statements are false.

7. **(b)** $196 = 2^2 \cdot 7^2$, sum of exponents = 2 + 2 = 4

8. **(a)** When 2^{256} is divided by 17 then, $\frac{2^{256}}{2^4+1} = \frac{(2^4)^{64}}{(2^4+1)}$
By remainder theorem when $f(x)$ is divided by $x + a$ the remainder = $f(-a)$
Here, $f(a) = (2^4)^{64}$ and $x = 2^4$ and $a = 1$
$\therefore$ Remainder = $f(-1) = (-1)^{64} = 1$

9. **(c)** Since, the sum of all the three prime numbrs is 100.
Then, there are two cases
Case 1: All the three numbers should be even because 100 is an even number. But this case is not possible as there is only one even prime.
Case 2 : One prime is even and other two primes are odd.
Since, 2 is only even prime, so it must be one of three primes.
Let p and $p + 36$ be the other two primes.
Then, according to question
$2 + p + (p + 36) = 100$; $2p + 38 = 100$
$2p = 100 - 38 = 62$; $p = \frac{62}{2} = 31$
So, all the three primes are 2, 31 and 67.
Hence, largest prime number is 67.

10. **(d)** $0.1\overline{34} = \frac{134-1}{990} = \frac{133}{990}$

11. **(d)** The L.C.M. of 16, 20 and 24 is 240. The least multiple of 240 that is a perfect square is 3600 and also we can easily eliminate choices (a) and (c) since they are not perfect number. Hence, the required least number which is also a perfect square is 3600 which is divisible by each of 16, 20 and 24.

12. **(d)** Out of n and $n + 2$, one is divisible by 2 and the other by 4, hence $n(n + 2)$ is divisible by 8. Also n, $n + 1$, $n + 2$ are three consecutive numbers, hence one of them is divisible by 3. Hence, $n(n + 1)(n + 2)$ must be divisible by 24. This will be true for any even number n.

13. **(a)** The number divisible by 15, 25 and 35 = L.C.M. (15, 25, 35) = 525
Since, the number is short by 10 for complete division by 15, 25 and 35.
Hence, the required least number = 525 – 10 = 515.

14. **(d)** $3^{13} - 3^{10} = 3^{10}(3^3 - 1) = 3^{10}(26) = 2 \times 13 \times 3^{10}$
Hence, $3^{13} - 3^{10}$ is divisible by 2, 3 and 13.

15. **(d)** Sum is 888 $\Rightarrow$ unit's digit should add up to 8. This is possible only for option (d) as "3" + "5" = "8".

16. **(d)**

17. **(d)** L.C.M × H.C.F = First number × second number
Hence, required number = $\frac{36\times2}{18} = 4$.

18. **(b)** Value of $n = 2$.

19. **(a)** Since, p_1 and p_2 are odd primes and sum of two odd number is an even number.
So, $p_1 + p_2$ is an even number.
Since, multiple of even number is always even.
Therefore, $(p_1 + p_2)(p_1 - p_2)$ is even
Hence, $p_1^2 - p_2^2 = (p_1 + p_2)(p_1 - p_2)$ is an even number.

20. **(a)** Since, x is divided by 5, the remainder is 2
therefore x = 5m + 2
similarly, y = 5n + 4 consider x + y = 5(m + n) + 6
= 5(m + n) + 5 + 1 = 5(m + n + 1) + 1
But given that when x + y is divided by 5, the remainder is z
$\therefore \quad z = 1$
Now, $\frac{2z-5}{3} = \frac{2(1)-5}{3} = -1$

21. **(b)** We know that

$13! = 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10 \times 11 \times 12 \times 13$

$= 2^{10} \times 3^5 \times 5^2 \times 7 \times 11 \times 13 \Rightarrow 24^k = (2^3 \times 3)^k$

where k is largest non-negative integer

When 13! is an divided by 24^k, we get

$$\frac{2^{10} \times 3^5 \times 5^2 \times 7 \times 11 \times 13}{2^{3k}.3^k}$$

$= 2^{10-3k} . 3^{5-k} . 5^2 \times 7 \times 11 \times 13$

$\therefore$ $10 - 3k$ is integer.

Then, maximum value of $k = 3$.

22. **(a)** **Given:** The natural number, when divided by 13 leaves remainder 3

The natural number, when divided by 21 leaves remainder 11

So, $13 - 3 = 21 - 11 = 10 = k$

Now, LCM (13, 21) = 273

But the number lies between 500 and 600

$\therefore$ 2 LCM (13, 21) – k = 546 – 10 = 536

$536 = 19 \times 8 + 4$ $\therefore$ remainder = 4

23. **(a)** Let $a_1, a_2, a_3, ..., a_{100}$ be non-zero real number and

$$a_1 + a_2 + a_3 + ... + a_{100} = 0$$

$$a_i \cdot 2^{a_i} > a_i \text{ and } a_i \cdot 2^{-a_i} < a_i$$

$$\therefore \sum_{i=1}^{100} a_1 \cdot 2^{a_i} > \sum_{i=1}^{100} a_i \text{ and } \sum_{i=1}^{100} a_1 \cdot 2^{-a_i} < \sum_{i=1}^{100} a_i$$

$$\Rightarrow \sum_{i=1}^{100} a_1 \cdot 2^{a_i} > 0 \text{ and } \sum_{i=1}^{100} a_1 \cdot 2^{-a_i} < 0$$

Hence, option (a) is correct.

24. **(c)** Let $x = 0.\overline{235}$ ...(i)

$1000x = 235.\overline{235}$ ...(ii)

Subtract (i) from (ii), $999x = 235 \Rightarrow x = \frac{235}{999}$

25. **(d)** Let us consider that $n^2 + 3$ is divisible by 17

$\therefore n^2 + 3 = 17K \quad [K \in N]$

$\Rightarrow n^2 = 17K - 3 \Rightarrow n^2 = 3(17m - 1) \quad [\because K = 3m]$

$3(17m - 1)$ is a perfect square, which is not possible.

$\therefore n^2 + 3$ is never divisible by 17.

In, $n^2 + 4$, put $n = 9$

So, $(9)^2 + 4 = 81 + 4 = 85$ which is divisible by 17.

$\therefore$ I is true and II is false.

26. **(c)** $\frac{1}{7} = 0.\overline{142857}$

The second positive integer whose reciprocal have six different repeating decimals is

$\frac{1}{13} = 0.\overline{076923}$

And the third positive integer whose reciprocal have six different repeating decimals is

$\frac{1}{21} = 0.\overline{047619}$

Therefore, the values of x are 7, 13, 21

Hence, the required sum is = 7 + 13 + 21 = 41

27. **(b)** $\because$ $m = n^2 - n = n(n-1)$

Now, $m^2 - 2m = m(m-2)$

$= n(n-1)(n^2 - n - 2) = n(n-1)(n-2)(n+1)$

Since we know that product of any four consecutive integers is always divisible by 24.

$\therefore m^2 - 2m$ is divisible by 24.

28. **(d)** For given numbers,

$(55)^{725}$, unit digit = 5; $(73)^{5810}$, unit digit = 9

$(22)^{853}$, unit digit = 2

Unit digit in the expression

$55^{725} + 735^{810} + 22^{853}$ is 6

29. **(c)** **30.** **(d)** **31.** **(b)**

32. **(b)** Since, H.C.F. of co-prime number is 1.

$\therefore$ Product of two co-prime numbers is equal to their L.C.M. So, L.C.M. = 117

33. **(d)**

34. **(a)**

35. **(a)** Unit digit in (7^{95}) = Unit digit in $[(7^4)^{23} \times 7^3]$

= Unit digit in 7^3 (as unit digit in $7^4 = 1$)

= Unit digit in 343

Unit digit in 3^{58} = Unit digit in $(3^4)^4 \times 3^2$

[as unit digit $3^4 = 1$]

= Unit digit is 9

So, unit digit in $(7^{95} - 3^{58})$

= Unit digit in (343 – 9) = Unit digit in 334 = 4

Unit digit in $(7^{95} + 3^{58})$ = Unit digit in (343 + 9)

= Unit digit in 352 = 2

So, the product is $4 \times 2 = 8$

36. **(c)**

37. **(a)**

38. **(c)** For getting least number of books, taking LCM of 32, 36

4	32, 36
8	8, 9
9	1, 9
	1, 1

$\Rightarrow$ $4 \times 8 \times 9 = 288$

39. **(b)** HCF of 32, 36 is

4	32, 36
	8, 9

= 4

40. **(a)** 36 is expressed as prime
$36 = 2 \times 2 \times 3 \times 3 = 2^2 \times 3^2$

41. **(b)** $7 \times 11 \times 13 \times 15 + 15$
$\Rightarrow$ $15(7 \times 11 \times 13 + 1)$
so given no. is a composite number.

42. **(b)** Given a, b are prime number. So
LCM of p, q, where $p = ab^2$, $q = a^2b$
$p = a \times b \times b$
$q = a \times b \times a$
$a \times b \times b \times a \Rightarrow a^2b^2$

43. **(b)** For maximum number of participants, taking HCF of 60, 84 and 108

12	60, 84, 108
	5, 7, 9

= 12

44. **(d)** Minimum number of rooms required are
$5 + 7 + 9 = 21$

45. **(a)** LCM of 60, 84, 108 is
$12 \times 5 \times 7 \times 9 = 3780$

46. **(d)** Product is $= 12 \times 3780 = 45360$

47. **(d)** $108 = 2 \times 2 \times 3 \times 3 \times 3 = 2^2 \times 3^3$

48. **(b)** $x = 5 \times 2783 = 13915$

49. **(c)** $y = 253\overline{)2783}(= 11$

50. **(b)** $z = 11\overline{)253}(= 23$

51. **(a)** Composite number having more than 2 factors.

52. **(c)** Prime factorisation of 13915 =

5	13915
11	2783
11	253
23	23
	1

$\Rightarrow$ $5 \times 11 \times 11 \times 23$
$\Rightarrow$ $5 \times 11^2 \times 23$

53. **(a)** Reason is correct.
Since, the factors of the denominator 3125 is of the form $2^0 \times 5^5$.
$\therefore$ $\frac{13}{3125}$ is a terminating decimal
Since, assertion follows from reason.

54. **(a)** Reason is clearly true.
Again, $34.12345 = \frac{3412345}{100000} = \frac{682469}{20000} = \frac{682469}{2^5 \times 5^4}$
Its denominator is of the form $2^m \times 5^n$, where
$m = 5$, $n = 4$ are non-negative integers
$\therefore$ Assertion is true. Since, reason gives assertion
$\therefore$ (a) holds.

55. **(d)** Here, reason is true [standard result]
Assertion is false. $\because \frac{3072}{16} = 192 \neq 162$

56. **(c)** Here, reason is not true.
$\because \sqrt{4} = \pm 2$, which is not an irrational number.
$\therefore$ Reason does not hold. Clearly, assertion is true.

57. **(a)** **58.** **(b)** **59.** **(a)**

60. (A) $\rightarrow$ (r) [$\because$ $12 = 3 \times 4$ $\because$ it is a composite number]
(B) $\rightarrow$ (s) [$\because$ g.c.d. between 2 and 7 = 1]
(C) $\rightarrow$ (p) [$\because$ 2 is a prime number]
(D) $\rightarrow$ (q) [$\because$ $\sqrt{2}$ is not a rational number]

61. (A) $\rightarrow$ (r); (B) $\rightarrow$ (p); (C) $\rightarrow$ (q)

62. (A) $\rightarrow$ (s); (B) $\rightarrow$ (p); (C) $\rightarrow$ (q); (D) $\rightarrow$ (r)

63. irrational **64.** irrational
65. 4 **66.** irrational
67. irrational **68.** algorithm
69. lemma **70.** 9696
71. 6 **72.** $2^2 \times 3 \times 13$
73. terminating
74. True **75.** True
76. True **77.** True
78. True **79.** False
80. True **81.** True
82. True