Real Number

MULTIPLE CHOICE QUESTIONS AND OBJECTIVE

QUESTIONS (1 MARK)

Q1. HCF of 8, 9, 25 is

a) 8

b) 9

c) 25

d) 1

Q.2. The product of a rational and irrational number is

a) Rational

b) Irrational

c) both of above

d) none of above

Q3. L.C.M. of 23 × 32 and 22 × 33 is :

a) 23

b) 33

c) 23 × 33

d) 22 × 32

Q4. State fundamental theorem of arithmetic

Q5. The product of a non-zero number and an irrational number is:

a) always irrational

b) always rational

c) rational or irrational

d) one

Q6. If p and q are two coprime numbers, then find the HCF and LCM of p and q.

Q7. Prime factorization of 120 is ...

Q8. Find the LCM of smallest prime and the smallest odd composite natural number

Q9. If HCF (26, 169) = 13, then LCM (26, 169) is ...

a) 26

b) 52

c) 338

d) 13

Q10. 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

SHORT ANSWER QUESTIONS (2 MARKS)

Q1. Find the prime factorization of 1152

Q2. Prove that √5 is irrational

Q3. The difference of the irrational numbers 5 + √2 and 5 - √2?

Q4. Explain why 3 × 5 × 7 + 7 is a composite number.

Q5. Prove that √2 is irrational

Q6. Determine the prime factorisation of 2057?

Q7. If a=23×3, b=2×3×5, c=3n×5 and LCM [a,b,c] = 23×32×5 then, n=?

Q8. If p and q are two coprime numbers, then p3 and q3 are?

Q9. The product of two numbers is 228096 and their LCM is 66. Find their HCF.

Q20. The length, breadth and height of a room are 825 cm, 675 cm and 450 cm respectively. Find the longest tape which can measure the three dimensions of the room exactly.

SHORT ANSWER QUESTIONS (3 MARKS)

Q1. Two brands of chocolates are available in packs of 24 and 15 respectively. If I buy an equal number of chocolates of both kinds, what is the least number of boxes of each kind I would need to buy?

Q2. Two bells toll at intervals of 24 minutes and 36 minutes respectively. If they toll together at 9am, after how many minutes do they toll together again, at the earliest?

Q3. There are 44 boys and 32 girls in a class. These students arranged in rows for a prayer in such a way that each row consists of only either boys or girls, and every row contains an equal number of students. Find the minimum number of rows in which all students can be arranged.

Q4.144 Cartons of coke can and 90 cartons of Pepsi can are to be stacked in a canteen. If eachstack is of the same height and is to contain cartons of the same drink. What would be the greater number of cartons each stack would have?

Q5. Find the LCM and HCF of the following pairs of positive integers by applying the prime factorization method.

1. a) 225, 240
2. b) 52 ,63 ,162

Q6.Find the largest number which divides 70 and 125 leaving reminder 5 and 8 Respectively.

Q7. Find HCF and LCM of 867 and 255 and verify the that HCF x LCM = Product of the two given numbers

Q8. Explain why 17 x 5 x 11 x 3 x 2 + 2 x11 is a composite number.

Q9.If the sum of LCM and HCF of two numbers is 1260 and their LCM is 900 more than their HCF then, find the product of two numbers.

Q10. Can two numbers have 15 as their HCF and 175 as their LCM? Give reasons.

Long Answer Type Questions (4 marks)

Q1. A hall has a certain number of chairs. Guests want to sit in different groups like in pairs, triplets, quadruplets, fives and sixes etc. When organiser arranges chairs in such pattern like 2's, 3's ,4's.5's and 6's then 1,2,3,4 and 5 chairs are left respectively. But when he arranges in 11's no chair will be left

1. In the hall how many chairs are available?

a) 407

b) 143

c) 539

d) 209

2. If one chair is added to the total number of chairs, how many chairs will be left when arranged in 11's

Q2. Kerosene, paraffin, or lamp oil is a combustible hydrocarbon liquid which is derivative from petroleum. Kerosen's uses vary from fuel for oil lamps to cleaning agents , jet fuel , heating oil or fuel for cooking Two oil tankers contain 825 litres and 675 litres of kerosene oil respectively.

1. Find the maximum capacity of a container which can measure the Kerosene oil of both the tankers when used an exact number of times.

2. How many times we have to use container for both the tanker to fill?

Q3. The sum of LCM and HCF of two numbers is 7380.If the LCM of these numbers is 7340 more than their HCF. Find the product of the two numbers.

Q4. A woman wants to organise her birthday party. She was happy on her birthday but there was a problem that she does not want to serve fast food to her guests because she is very health conscious. She as 15 apples and 40 bananas at home and decided to serve them. She want to distribute fruits among guests. She does not want to discriminate among guests so she decided to distribute equally among all. So

1. How many guests she can invite?

2. How many apples and banana will each guest get?

Q5. A charitable trust donates 28 different books of Maths,16 different books of science and 12 different books of Social Science to the poor students. Each student is given maximum number of books of only one subject of his interest and each student got equal number of books

1. Find the number of books each student got.

2. Find the total number of students who got books.

ANSWERS

Que	Answer to Multiple Choice Questions
1	**d) 1**
2	**b) irrational**
3	***c) 2^3 X 3^3***
4	**Fundamental Theorem of Arithmetic states that every integer greater than 1 is either a prime number or can be expressed in the form of primes. In other words, all the natural numbers can be expressed in the form of the product of its prime factors.**
5	**(a) Always irrational**
6	**HCF = 1 and LCM = pq**
7	***2^3X3X5***
8	**LCM of 2 and 4 is 4**
9	**c) 338**
10	**c) 4**
Que	**SHORT ANSWER QUESTIONS (2 MARKS)**
1	1152= 2^7 X 3^2
2	Using technique proof by contradiction Let us assume, to the contrary, that 5 is rational. That is, we can find integers a and b (≠ 0) such that 5 = a/b · Suppose a and b have a common factor other than 1, then we can divide by the common factor, and assume that a and b are coprime. So, b√5= ·a Squaring on both sides, and rearranging, we get $5b^2 = a^2$. Therefore, a@ is divisible by 5, and by theorem of proof by contradiction, let p be a prime number. If p divides a^2, then p divides a, where a is a positive integer, it follows that a is also divisible by 5. So, we can write a = 5c for some integer c. Substituting for a, we get $5b^2 = 25c^2$, that is, $b^2 = 5c^2$. This means that b^2 is divisible by 5, and so b is also divisible by 5 (using theorem of proof by contradiction p = 5). Therefore, a and b have at least 5 as a common factor. But this contradicts the fact that a and b are coprime. This contradiction has arisen because of our incorrect assumption that 5 is rational. So, we conclude that √5 is irrational.
3	*2√2*
4	112 is an even number and is therefore a composite number

5	**U**sing technique proof by contradiction Let us assume, to the contrary, that 2 is rational. That is, we can find integers a and b ($\neq 0$) such that $2 = a/b$ · Suppose a and b have a common factor other than 1, then we can divide by the common factor, and assume that a and b are coprime. So, $b\sqrt{2} = a$ Squaring on both sides, and rearranging, we get $2b^2 = a^2$. Therefore, a^2 is divisible by 2, and by the theorem of proof by contradiction, let p be a prime number. If p divides a^2, then p divides a, where a is a positive integer, it follows that a is also divisible by 2. So, we can write a = 2c for some integer c. Substituting for a, we get $2b^2 = 4c^2$, that is, $b^2 = 2c^2$. This means that b^2 is divisible by 2, and so b is also divisible by 2 (using theorem of proof by contradiction p = 2). Therefore, a and b have at least 2 as a common factor. But this contradicts the fact that a and b are coprime. This contradiction has arisen because of our incorrect assumption that 2 is rational. So, we conclude that $\sqrt{2}$ is irrational.
6	$2 \times 5 \times 11^2 \times 17$
7	*2*
8	Coprime
9	36
10	75 cm
Que	**LONG ANSWER QUESTIONS (3 MARKS)**
1	5 of 1st kind, 8 of 2nd kind
2	$24 = 2^3 \times 3$ $36 = 2^2 \times 3^2$ LCM = $2^3 \times 3^2 = 8 \times 9 = 72$ After 72 minutes = 1 hr 12 minutes they toll together.
3	*$44 = 2^2 \times 11$* *$32 = 2^5$* *HCF = $2^2 = 4$* *Therefore, minimum number of rows in which all srudents can be arranged = 44/4 + 32/4 = 11 + 8 = 19 rows*
4	$144 = 2^4 \times 3^2$ $90 = 2 \times 3^2 \times 5$ HCF = $2 \times 3^2 = 18$ cartons
5	a. HCF (225, 240) = 15 LCM (225, 240) = 600 1. HCF (52, 6, 162) = 1 LCM (52, 63, 162) = 29484
6	70 – 5 = 65 125 – 8 = 117

	65 = 5 x 13 117 = 3^2x 13 HCF = 13 i.e., 13 is the largest number that will divide 65 and 117.
7	*LCM (867, 255) = 4335,* *HCF (867, 255) = 51.* *Verification by showing* *Product of 867*255 = Product of 4335*51* *Therefore, LHS = RHS i.e., 867 x 255 = 4335 x 51*
8	17 x 5 x 11 x 3 x 2 + 2 x 11 = 2 x 11 (17 x 5 x 3 + 1) = 2 x 11 (255 + 1) = 2 x 11 x 256 = 2 x 11 x 2^8 This number has more than 2 prime factors. Therefore, 17 x 5 x 11 x 3 x 2 + 2 x 11 is a composite number.
9	194400
10	No, two numbers cannot have 15 as their HCF and 175 as LCM because, HCF of the numbers must be a factor of the LCM. **OR** Since We know that LCM divides by HCF but LCM 175 does not divide by HCF 15. Hence, HCF and LCM of two numbers cannot be 15 and 175, respectively.
Que	**LONG ANSWER QUESTIONS (4 MARKS)**
1	(i) 539 chairs (ii) if 1 chair is added as 539 is already divisible by 11 ,1 chair will be left
2	(i) HCF of 825 and 625 825 = 3 x 5 x 5 x 11 675 = 3 x 3 x 3 x5 x 5 HCF = 3 x 5 x 5 = 75 Maximum capacity reqired is 75 litres (ii) The first tanker will require 875/75 = 11 times to fill The second tanker will require 675/75 = 9 times to fill
3	*LCM + HCF = 7380* *LCM – HCF = 7340* *2LCM = 14720* *LCM = 14720/2* *LCM = 7360* *LCM + HCF = 7380* *7360+ HCF = 7380* *HCF = 7380 – 7360* *HCF = 20 (1)* *HCF x LCM = product of numbers* *20 x 7360= product of numbers* *147200 = product of numbers*

4	(i)HCF of(15,40) =5 Fruits will be distributed equally among 5 guests (ii)Out of 15 apples each guest will get 15 /5 = 3 apples Out of 40 banana each guest will get 40/5 =8 bananas
5	(i) HCF of 28,16 and 12 is 4 Therefore maximum number of books each student get is 4 (ii) Number of maths books 28/4 = 7 Number of science books 16/4 = 4 Number of social science = 12/4 = 3 Total books = 7 + 4 + 3 =14