COMPETENCY BASED QUESTIONS

Chapter: Real Numbers

LEARNING OUTCOMES

- Students will be able to explain the method of finding the LCM and HCF using the fundamental theorem of arithmetic.
- Establish knowledge on real numbers and understand the relationship between natural numbers, integers, rationa2ls, irrationals as subsets of real numbers.
- Generalizes the properties of numbers

ASSERTION REASON

DIRECTION: In the following questions a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. Choose the correct option.
(A) Both Assertion (A) and Reason(R) are true and Reason(R) is the correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason(R) are true but Reason(R) is not the correct explanation of Assertion (A).

(C) Assertion (A) is true but Reason(R) is false.

(D) Assertion (A) is false but Reason(R) is true

Q1. Assertion: The HCF of P and 62 is 31 if p = 9

Reason: product of HCF x LCM = Product of 9 x 62

Q2. Assertion (A): There are two whole numbers '*a*' and '*b*' such that HCF (*a*, *b*) = 16 and LCM (*a*, *b*) = 192 .

Reason(R): The LCM of two prime numbers is the product of the numbers.

Q3. **A number q is prime factorized as $2^2 \times 3^2 \times b$, where b is an odd prime number other than 3**.

Based on the above information, two statements are given below -one labelled Assertion (A) and the other labelled Reason (R). Read the statements carefully and choose the option that correctly describes statements (A) and (R)

Assertion (A): q is definitely an even number.

Reason (R): 3^2x b is an even number since b is an odd prime.

Q4. **Assertion (A):** All composite numbers can be written as the product of primes.

Reason (R): 6 is a composite number which can be written as the product of primes 1,2 and 3.

Q5. Assertion (A): The HCF of two numbers is 14 and their product of the numbers is 6860. Then their LCM is 490.

Reason (R): If a, b are two positive integers, then $HCF \times LCM = a \times b$.

Q6. **Assertion (A):**(2+$\sqrt{5}$) is an irrational number.

Reason (R): The sum or difference of a rational and an irrational number is irrational.

Q7. Assertion(A): $3 \times 5 \times 7 + 7$ **is a composite number.**

Reason(R):Any number ends with digit zero, if its prime factor is of the form $\mathbf{2^m} \times 5^{\boldsymbol{n}}$, where m and n are natural numbers.

Q8. Assertion (A): If the product of two numbers is 5780 and their HCF is 17, then their LCM is 340.

Reason (R): HCF is always a factor of LCM.

Q9. Assertion:$\sqrt{196}$ is a rational number.
Reason: If p is an even number, then $\sqrt{p}$ is always rational.

Q10. Assertion (A): $n^2+ n$ is divisible by 2 for every natural number n.

Reason (R): The product of two consecutive natural numbers is an even natural number.

MULTIPLE CHOICE QUESTIONS

Q11. If p and q are natural numbers and p is the multiple of q then what is the LCM of p and q

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

Q12. If 2 positive integers x and y are expressible in terms of primes as $x= p^2q^3$ and $y=p^3q$, then which of the following is true?

a) HCF +LCM=pq^2 (1+pq^2) b) HCF +LCM=p^2q (1+pq^2)

c) HCF+LCM=$p^3q\ (1+p^2q)$ d) HCF+LCM=$pq^3\ (1+p^2q)$

Q13. Rita takes 35 seconds to pack and label the box. For Renu the same job takes 42 seconds and for Roy it takes 28 seconds. If they all start using labeling machine at the same time, after how many seconds will they be using the labeling machines together?

a) 420 b) 7 c) 42 d) 70

Q14. If n is a natural number, then $2(5^n + 6^n)$ always ends with

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

Q15. Let p be a prime number. The quadratic equation having its zeros as factor of p is

(a) $x^2 – p\,x + p = 0$ (b) $x^2 – (p+1)x + (p+1) = 0$

(c) $x^2 – (p+1)x + p = 0$ (d) $x^2 – p + (p+1)+0$

CASE SUDY

Q16. To aware students about reading and to create the reading atmosphere, BHAVAN'S GVM School has kept reading challenge in October,2023 in between X A and X B .There are 36 students in X A and 34 students in X B .on the basis of above information answer the following :

a) What is the HCF of 36 and 34

b) If the product of two positive integers is equal to the product of their HCF and LCM then justify it by considering 36 and 34 are integers .

OR

b) Find the LCM of the number of days in the year 2023 and October month.

c)) What is the minimum number of books required for this, so that they can be distributed equally among students of Section A or Section B?

Q17. As rural libraries play a vital role to bring change in the life of rural India, government has formed various committees and commissions that has given due emphasis to set up rural libraries throughout the country. Rural libraries provide all information, inculcate ideas and develop knowledge among the rural masses. Since rural libraries can act as a hub of activities and help in the overall development of a village, a group of villagers decides to construct a small library in their village with the following dimensions.

The floor of the room is 10m 35 cm long and 9m broad. It is to be paved with square tiles of the same size.

i) Find the maximum edge of the square tile needed.

ii) What is the least number of square tiles needed to cover the floor?

iii) Find the greatest length of a rod that can measure the dimensions of the floor in exact number of times.

Q18. A group of students is organizing a charity event and planning to make packages containing school supplies to be distributed to children in an orphanage. They have decided to include notebooks, pencils, and erasers in each package.

- Notebooks come in packs of 60, pencils in packs of 30, and erasers in packs of 24.
- Each package should have an equal number of notebooks, pencils, and erasers.
- The students want to create the maximum number of packages without wasting any leftover items.

Based on the above information, answer the questions that follow.

i) Determine the maximum number of packages that can be made while ensuring that each package has an equal number of notebooks, pencils and erasers. (1mark)

ii) The organizers want to give one package to each of the 30 children in the orphanage. How many packs of notebooks, pencils and erasers should they buy to make the packages? (1mark)

iii) Calculate the number of notebooks, pencils, and erasers in each package if all items are utilized optimally. (2mark)

OR

If the cost of each notebook is Rs.22, each pencil is Rs.5 and each eraser is Rs.2.50, find the total amount spent on procuring all the items for the 30 children. (2mark)

QTHER QUESTIONS

Q19. Find all positive integers whose sum is 91 and and HCF is 13.

Q20. If $7^x + 7^y = 392$, $x + y = 5$ find x and y.

ANSWER KEY

Q1. d)

Q2. b)

Q3. c)

Q4. C)

Q5. A) Explanation: Since HCF × LCM = a × b
⇒6860 = 14 × 490
⇒6860=6860

Q6. A)

Q7. B)

Q8. B)

Q9. C)

Q10. A)

Q11. B)

Q12. B)

Q13. A)

Q14. B)

Q15. C)

Q16. a) Factors :36= 2 x 2 x 3 x 3
34 = 2 x 17
HCF = 2

b) 34 x 36 = 2 x 612

1224 = 1224

OR

LCM of 365 and 31 is 11315

c) LCM of 34 and 36 is 1224

Q17. i)Length =10m 35 cm =1035cm

Breadth = 9m= 900cm
1035=3x3x5x23 =3^2 x5x23

900 =2x2x3x3x5x5 =$2^2x3^2x5^2$

HCF (1035, 900) =3^2x5 =45

Maximum edge of square tile =45 cm

ii) Least number of tiles needed is=
$\frac{Area\ of\ the\ floor}{Area\ of\ 1\ square\ tile}$ = $\frac{1035X900}{45X45}$ = 460

iii) HCF (1035, 900) = 45
Length of the longest rod = 45 cm

Q18. i) HCF (60, 30, 24) = maximum number of packages that can be made with an equal number of each item.

HCF (60, 30, 24) = 6

ii) 5packs each of notebooks, pencils and erasers have to be bought.

iii) Number of notebooks in each package: 60/6=10

Number of pencils in each package: 30/6=5

Number of erasers in each package: 24/6=4

OR

Total amount spent = Rs.(60 x 22 + 30 x 5 + 24 x 2.50)5 = Rs.7650

Q19. HCF =13 , let x+y =91

13m+13n =91 (x=13m and n=13n)
13 (m+n) = 91 gives m+n = 7
Combinations are m=1, n=6 or m=2, n=5 or m=3 , n=4 or vice versa [13x1 +13x 6=13 +78=91 etc]
Ans:13 and 78 , 26 and 65 , 39 and 52

Q20. $7^x + 7^y = 392$

$7^x x 7^x + 7^x \times 7^y = 392 \times 7^x$

$(7^x)^2 + 7^{x+y} = 392 \times 7^x$

$P^2 + 7^5 = 392\ p$ (assume $p=7^x$)
Simplify to get p=343 and 49
Gives x=3 and y=2 or x=2 and y=3