Time allowed: 1 hour

SECTION A

1. Choose and write the correct option in the following questions. (3 × 1 = 3)

(*i*) The sum of exponents of prime factors in the prime factorisation of 196 is

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

(*ii*) The LCM and HCF of two rational numbers are equal then the numbers must be

(*a*) prime (*b*) composite (*c*) not equal (*d*) equal

(*iii*) The product of a non zero rational and an irrational number is [*NCERT Exemplar*]

(*a*) always irrational (*b*) always rational

(*c*) rational or irrational (*d*) one

2. Solve the following questions. (2 × 1 = 2)

(*i*) If two positive integers p and q are written as $p = a^2b^3$ and $q = a^3b$; a, b are prime numbers then find HCF (p, q).

(*ii*) Given that HCF (135, 225) = 45, find the LCM (135, 225). [*CBSE* 2020(30/4/1)]

SECTION B

■ **Solve the following questions.** (4 × 2 = 8)

3. What is the least number that is divisible by all the numbers from 1 to 10?

4. Find the sum of $0.\overline{68} + 0.\overline{73}$.

5. Show that $5 + 2\sqrt{7}$ is an irrational number, where $\sqrt{7}$ is given to be an irrational number. [*CBSE* 2020(30/5/1)]

6. Given that $\sqrt{2}$ is irrational, prove that $(5 + 3\sqrt{2})$ is an irrational number. [*CBSE* 2018]

■ **Solve the following questions.** (4 × 3 = 12)

7. Given that $\sqrt{5}$ is irrational, prove that $2\sqrt{5} - 3$ is an irrational number. [*CBSE Sample Question Paper* 2021]

8. Find the LCM and HCF of 12, 15 and 21 by applying the prime factorisation method.

9. Find the LCM of $x^2 - 4$ and $x^4 - 16$.

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

■ **Solve the following questions.** (3 × 5 = 15)

11. 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 carton of same drink. What would be the greatest number of cartons in each stack?

12. 105 donkeys, 140 cows and 175 goats have to be taken across a river. There is only one boat which will have to make many trips in order to do so. The lazy boatman has his own conditions for transporting them. He insists that he will take the same number of animals in every trip and they have to be of the same kind. He will naturally like to take the largest possible number each times, find how many animals went in each trip?

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