

Choose the correct answer from the given four options in the following questions:

- For some integer  $m$ , every even integer is of the form  
 (A)  $m$  (B)  $m + 1$   
 (C)  $2m$  (D)  $2m + 1$
- For some integer  $q$ , every odd integer is of the form  
 (A)  $q$  (B)  $q + 1$   
 (C)  $2q$  (D)  $2q + 1$
- $n^2 - 1$  is divisible by 8, if  $n$  is  
 (A) an integer (B) a natural number  
 (C) an odd integer (D) an even integer
- If the HCF of 65 and 117 is expressible in the form  $65m - 117$ , then the value of  $m$  is  
 (A) 4 (B) 2  
 (C) 1 (D) 3
- The largest number which divides 70 and 125, leaving remainders 5 and 8, respectively, is  
 (A) 13 (B) 65  
 (C) 875 (D) 1750
- If two positive integers  $a$  and  $b$  are written as  
 $a = x^3y^2$  and  $b = xy^3$ ;  $x, y$  are prime numbers, then HCF ( $a, b$ ) is  
 (A)  $xy$  (B)  $xy^2$  (C)  $x^3y^3$  (D)  $x^2y^2$
- If two positive integers  $p$  and  $q$  can be expressed as  
 $p = ab^2$  and  $q = a^3b$ ;  $a, b$  being prime numbers, then LCM ( $p, q$ ) is  
 (A)  $ab$  (B)  $a^2b^2$  (C)  $a^3b^2$  (D)  $a^3b^3$
- The product of a non-zero rational and an irrational number is  
 (A) always irrational (B) always rational  
 (C) rational or irrational (D) one
- The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is  
 (A) 10 (B) 100 (C) 504 (D) 2520
- The decimal expansion for the rational number  $\frac{14587}{1250}$  will terminate after:  
 (A) one decimal place (B) two decimal places  
 (C) three decimal places (D) four decimal places

## REAL NUMBERS WORK SHEET 2 CHAPTER 1

1. Write whether every positive integer can be of the form  $4q + 2$ , where  $q$  is an integer. Justify your answer.
2. “The product of two consecutive positive integers is divisible by 2”. Is this statement true or false? Give reasons.
3. “The product of three consecutive positive integers is divisible by 6”. Is this statement true or false”? Justify your answer.
4. Write whether the square of any positive integer can be of the form  $3m + 2$ , where  $m$  is a natural number. Justify your answer .
5. A positive integer is of the form  $3q + 1$ ,  $q$  being a natural number. Can you write its square in any form other than  $3m + 1$  or  $3m$  or  $3m + 2$  for some integer  $m$ ? Justify your answer.
6. The numbers 525 and 3000 are both divisible only by 3, 5, 15, 25 and 75. What is
7. Explain why  $3 \times 5 \times 7 + 7$  is a composite number.
8. Can two numbers have 18 as their HCF and 380 as their LCM? Give reasons.
9. Without actually performing the long division, find if  $\frac{987}{10500}$  will have terminating or non-terminating (repeating) decimal expansion. Give reasons for your answer.
10. A rational number in its decimal expansion is 327.7081. What can you say about the prime factors of  $q$ , when this number is expressed in the form  $\frac{p}{q}$ ? Give reason.

### REAL NUMBERS WORK SHEET 3 CHAPTER 1

1. Show that the square of any positive integer is either of the form  $4q$  or  $4q + 1$  for some integer  $q$ .
2. Show that cube of any positive integer is of the form  $4m$ ,  $4m + 1$  or  $4m + 3$ , for some integer  $m$ .
3. Show that the square of any positive integer cannot be of the form  $5q + 2$  or  $5q + 3$  for any integer  $q$ .
4. Show that the square of any positive integer cannot be of the form  $6m + 2$  or  $6m + 5$  for any integer  $m$ .
5. Show that the square of any odd integer is of the form  $4q + 1$ , for some integer  $q$ .
6. If  $n$  is an odd integer, then show that  $n^2 - 1$  is divisible by 8.
7. Prove that if  $x$  and  $y$  are both odd positive integers, then  $x^2 + y^2$  is even but not divisible by 4.
8. Use Euclid's division algorithm to find the HCF of 441, 567, 693.
9. Using Euclid's division algorithm, find the largest number that divides 1251, 9377 and 15628 leaving remainders 1, 2 and 3, respectively.
10. Prove that  $\sqrt{3} + \sqrt{5}$  is irrational.
11. Show that  $12^n$  cannot end with the digit 0 or 5 for any natural number  $n$ .
12. On a morning walk, three persons step off together and their steps measure 40 cm, 42 cm and 45 cm, respectively. What is the minimum distance each should walk so that each can cover the same distance in complete steps?

13. Write the denominator of the rational number  $\frac{257}{5000}$  in the form  $2^m \times 5^n$ , where  $m, n$  are non-negative integers. Hence, write its decimal expansion, without actual division.
14. Prove that  $\sqrt{p} + \sqrt{q}$  is irrational, where  $p, q$  are primes.

#### REAL NUMBERS WORK SHEET 4 CHAPTER 4

1. Show that the cube of a positive integer of the form  $6q + r$ ,  $q$  is an integer and  $r = 0, 1, 2, 3, 4, 5$  is also of the form  $6m + r$ .
2. Prove that one and only one out of  $n, n + 2$  and  $n + 4$  is divisible by 3, where  $n$  is any positive integer.
3. Prove that one and only out of three consecutive positive integers must be divisible by 3.
4. For any positive integer  $n$ , prove that  $n^3 - n$  is divisible by 6.
5. Show that one and only one out of  $n, n + 4, n + 8, n + 12$  and  $n + 16$  is divisible by 5, where  $n$  is any positive integer.

**[Hint:** Any positive integer can be written in the form  $5q, 5q+1, 5q+2, 5q+3, 5q+4$ ].

