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
2. Find the largest number which divides 245 and 1037, leaving remainder 5 in each case.
3. The largest number which divides 70 and 125, leaving remainders 5 and 8, respectively, is
    a. (A)13 B) 65 (C) 875 (D) 1750
        i. Hint: largest term – HCF
4. find the largest number that divides 1251, 9377 and 15628 leaving remainders 1, 2 and 3, respectively.
5. Find the greatest number of 6 digits exactly divisible by 24, 15, and 36. Contradiction: greatest term but lcm
6. The number lies between 100000 and 110000 which is exactly divisible by 8,15 and 21 is
7. Find the least number which when divided by 35, 56 and 91 leaves the same remainder 7 in each case.
8. Find the largest four-digits number which when divided by 4, 7 and 13 leaves a remainder of 3 in each case.
9. Find the smallest number which when divided by 28 and 32 leaves remainders 8 and 12 respectively.
10. Find the least number which when divided by 20, 25, 35 and 40 leaves remainders 14, 19, 29 and 34 respectively
11. Find the smallest number which when increased by 17 is exactly divisible by both 468 and 520.
12. Find the least number which should be added to 2497 so that the sum is exactly divisible by 5, 6, 4 and 3.
13. Find the greatest number that will divide 43, 91 and 183 to leave the same remainder in each case.

14. If two positive integers a and b are written as $a = x^3 y^2$ and b = xy^3; x, y are prime numbers, then HCF (a, b) is
    i. (A)xy (B) xy ^{2} (C) x ^{3} y ^{3} (D) x ^{2} y ^{2}

15. 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

    i. (A)ab (B) $a^2 b^2$ (C) a^3b^2 (D) a^3b^3

16. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is

    i. (A)10 (B) 100 (C) 504 (D) 2520
    ii. Hint: least term --- LCM

17. The HCF of two numbers is 23 and their LCM is 1449. If one of the numbers is 161, find the other.

18. Given that HCF (252, 594) = 18, find LCM (252, 594).

19. Find the simplest form of 148/185

20. Find the HCF and LCM of 108, 120 and 252 using prime factorization method

21. The numbers 525 and 3000 are both divisible only by 3, 5, 15, 25 and 75. What is HCF (525, 3000)? Justify your answer.

22. Can two numbers have 18 as their HCF and 380 as their LCM? Give reasons.

23. Show that 12^n cannot end with the digit 0 or 5 for any natural number n.

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

25. Prove that $\sqrt{2} + \sqrt{3}$ is irrational.

26. Prove that $\sqrt{p} + \sqrt{q}$ is irrational, where p, q are primes.

27. If a is rational and $\sqrt{b}$ is irrational then prove that $a + \sqrt{b}$ is irrational.

28. If a is a nonzero rational and $\sqrt{b}$ is irrational then show that

i. a $\sqrt{b}$ is irrational

29. Three pieces of timber 42 m, 49 m, and 63 m long must be divided into planks of the same length. What is the greatest possible length of each plank?
   a. Hint: greatest term --- HCF

30. Find the greatest possible length which can be used to measure exactly the lengths 7 m, 3 m 85 cm, and 12 m 95 cm.
   a. Hint: greatest term --- HCF

31. Find the maximum number of students among whom 1001 pens and 910 pencils can be distributed in such a way that each student gets the same number of pens and the same number of pencils. Hint: MAXIMUM term --- HCF

32. Three sets of English, Mathematics, and Science books containing 336, 240, and 96 books respectively have to be stacked in such a way that all the books are stored subject-wise and the height of each stack is the same. How many stacks will be there?

33. Find the least number of square tiles required to pave the ceiling of a room 15 m 17 cm long and 9 m 2 cm broad.
   a. Hint: least term --- but HCF not LCM --- CONTRADICTION

34. Three measuring rods are 64 cm, 80 cm, and 96 cm in length. Find the least length of cloth that can be measured an exact number of times, using any of the rods.
   a. Hint: least term --- LCM

35. The traffic lights at three different road crossings change after every 48 seconds, 72 seconds, and 108 seconds respectively. If they all change simultaneously at 8 hours, then at what time will they again change simultaneously? ---LCM

36. An electronic device makes a beep after every 60 seconds. Another device makes a beep after every 62 seconds. They beeped together at 10 am. At what time will they beep together at the earliest? LCM

37. Six bells commence tolling together and toll at intervals of 2, 4, 6, 8, 10, and 12 minutes respectively. In 30 hours, how many times do they toll together? --- LCM

38. 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?

39. Two tanks contain 504 and 735 litres of milk respectively. Find the maximum capacity of a container that can measure the milk of either tank an exact number of times.

40. An army contingent of 612 members is to march behind an army band of 48 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?

41. A sweet seller has 420 kaju burfi s and 150 badam burfi s. He wants to stack them in such a way that each stack has the same number, and they take up the least area of the tray. How many of these can be placed in each stack? How many stacks are formed? Contradiction - hcf

42. Ravi and Sikha drive around a circular sports field. Ravi takes 16 minutes to take one round, while Sikha completes the round in 20 minutes. If both start at the same point, at the same time and go in the same direction, after how much time will they meet at the starting point?

43. In a school there are two sections, namely A and B, of class X. There are 30 students in section A and 28 students in section B. Find the minimum number of books required for their class library so that they can be distributed equally among students of section A or section B

44. In a seminar, the number of participants in Hindi, English and mathematics are 60, 84 and 108 respectively. Find the minimum number of rooms required, if in each room, the same number of

participants are to be seated and all of them being in the same subject.