	PARUL UNIVERSITY - FACULTY OF ENGINEERING & TECHNOLOGY **Department of Applied Science & Humanities** **3rd Semester B. Tech (CSE, IT)** **Discrete Mathematics (203191202)** **Tutorial -2 Principles of Mathematical Induction**

Q1.	Use the well-ordering property to prove the division algorithm. Recall that the division algorithm states that if a is an integer and d is a positive integer, then there are unique integers q and r with and .
Q2.	Find $f(1), f(2), f(3)$, and $f(4)$ if $f(n)$ is defined recursively by $f(0) = 1$ and for $n = 0, 1, 2, \ldots$
Q3.	Use the Euclidean algorithm to find **a)** gcd(100, 101). **b)** gcd(123, 277). **c)** gcd(1529, 14039).
Q4.	Find the prime factorization of each of these integers **a)** 88 **b)** 126 **c)** 729 **d)** 1001 **e)** 1111 **f)** 909,090
Q5.	Does 17 divide each of these numbers? **a)** 68 **b)** 84 **c)** 357 **d)** 1001
Q6.	There are 22 female students and 18 male students in a classroom. How many students are there in total?
Q7.	Of 32 people who save paper or bottles (or both) for recycling, 30 save paper and 14 save bottles. Find the number m of people who (a) save both, (b)save only paper, (c) save only bottles.
Q8.	Let L be a list (not necessarily in alphabetical order) of the 26 letters in the English alphabet (which consists of 5 vowels, A,E,I,O,U and 21 consonants). (a) Show that L has a sublist consisting of 4 or more consecutive consonants. (b) Assuming L begins with a vowel, say A, show that L has a sublist consisting of five or more consecutive consonants.
Q9.	Suppose that there are eight runners in a race. The winner receives a gold medal, the second place finisher receives a silver medal, and the third-place finisher receives a bronze medal. How many different ways are there to award these medals, if all possible outcomes of the race can occur and there are no ties?
Q10.	How many poker hands of five cards can be dealt from a standard deck of 52 cards? Also, how many ways are there to select 47 cards from a standard deck of 52 cards?