PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
Department of Applied Sciences & Humanities Third Semester B. Tech (CSE, IT) (2025-26)
Discrete Mathematics (303191202)
Tutorial 2 - Principles of Mathematical Induction

Q.1. Prove the following using Principle of Mathematical Induction:

1. $1^2 + 3^2 + 5^2 + \cdots + (2n-1)^2 = \frac{n(2n-1)(2n+1)}{3}$ **[Winter 2018 – 19]**
2. $1^3 + 2^3 + 3^3 + \cdots + n^3 = \left\{\frac{n(n+1)}{2}\right\}^2$ **[Winter 2021 – 22]**
3. $1^2 + 2^2 + 3^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}$ **[Summer 2021 – 22]**

Q.2. A positive integer p greater than 1 is called _____if the only positive factors of p are 1and p. **[Winter 2019 – 20]**

(a) Composite (b) Prime
(c) Rational (d) None of these

Q.3. What is the remainder when - 17 is divided by 5? **[Summer 2021-2022]**

(a) 3 (b) -3 (c) 2 (d) -2

Q.4. Which of the following is prime factorization of 10? **[Winter 2023 – 24]**

(a) 10 (b) 2 × 5 (c) 10 × 1 (d) All of the above.

Q.5. 107 is prime number. (True or False) **[Winter 2023 – 24]**

Q.6. The number of permutations of letter of word "MATHEMATICS" = _____ **[Summer 2023 – 24]**

Q.7. P (n, r) = _____C(n, r) **[Summer 2023 – 24]**

Q.8. How many positive integers not exceeding 1000 are divisible by 7 or 11**? [Winter 2022-23]**

(a) 110 (b) 106 (c) 102 (d) 220

Q.9. Find the g.c.d of the following:

1) (123, 36) 2) (1220, 516) 3) (527, 314)