JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

Test – 1 Examination, February 2024

B.Tech. IV Semester (CSE/IT)

COURSE CODE (CREDITS): 18B11CI414 (3) **MAX. MARKS:** 15

COURSE NAME: Discrete Computational Mathematics

COURSE INSTRUCTORS: Dr. Amol Vasudeva*, Dr. Neel Kanth, and Dr. R. K. Bajaj

MAX. TIME: 1 Hour

Note:
(a) All questions are compulsory. (b)Marks are indicated against each question in square brackets. (c) The candidate is allowed to make suitable numeric assumptions wherever required.

1. Among 50 patients admitted to a hospital, 25 are diagnosed with pneumonia, 30 with bronchitis, and 10 with both pneumonia and bronchitis. Determine: (CO-3) **[3 Marks]**
   (a) The number of patients diagnosed with pneumonia or bronchitis (or both).
   (b) The number of patients not diagnosed with pneumonia or bronchitis.

2. Using set-theoretic laws prove the following: (CO-3) **[2 Marks]**

$$A - (B \cap C) = (A - B) \cup (A - C) \quad .$$

3. Using the concept of mathematical induction, show that (CO-2) **[3 Marks]**

$$n^2 \geq 2n + 1, \text{ for all } n \geq 3.$$

4. Explain the process of cross-partition and show this mechanism of cross-partition for the set of first 7 consecutive odd natural numbers. (CO-3) **[2 Marks]**

5. Find the validity of the following argument using truth-table: (CO-1)
   If Roli has completed MBA, then she is assured of a good job. If Roli is assured of a good job, then she is happy. Roli is not happy therefore Roli has not completed MBA. **[3 Marks]**

6. Let $D = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$. Determine the truth set or truth value (whichever is applicable) for the following statements: (CO-1) **[2 Marks]**
   a) $(\forall x \in D), x + y < 15.$
   b) $(\exists x \in D), x + 4 = 10.$

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