Dr. P.K. Panigrahi

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATIONS-2022

B.Tech-IV Semester (ECE)

COURSE CODE: 18B11MA413 MAX. MARKS: 15

COURSE NAME: DISCRETE MATHEMATICS

COURSE CREDITS: 3 MAX. TIME: 1 Hour

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Marks are indicated against each question in square brackets.*

Q1. Define the duality principle for sets. Write the dual statement for the following

$$(A \cap B) \cup (B \cap A^c) \cup (A \cap B^c) = U$$

Here superscript c denotes the complement, and U is the universal set. **[3]**

Q2. Consider $A = \{2,3,4,5\}$, and $B = \{0,1,2,3\}$. Compute $A \times B$ and $B \times A$. Is $|A \times B| = |B \times A|$? **[3]**

Q3. For the set $S = \{a, b, c, d, e, f, g, h\}$ which of the following are partitions (explain):

(i) $A_1 = \{a, b, c, d\}, A_2 = \{d, e, f, g, h\}$.

(ii) $A_1 = \{a, b, c, d\}, A_2 = \{e, f, g\}, A_3 = \{h\}$. **[3]**

Q4. Let R is a relation on a set $A = \{a, b, c, d\}$, given by $R = \{(a, a), (b, b), (a, c), (c, d)\}$. Then prove or disprove that that R is:

(i) Reflexive (ii) Irreflexive (iii) Transitive **[3]**

Q5: Define directed graph of a relation? Represent the relation $R = \{(1,1), (2,1), (2,3), (1,3), (3,3), (3,4), (4,4)\}$ on set $A = \{1,2,3,4\}$ using a directed graph. **[3]**