JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS-2022

B.Tech-IV Semester (CSE/IT)

COURSE CODE: 18B11CI414

MAX. MARKS: 25

COURSE NAME: Discrete Computational Mathematics

COURSE CREDITS: 03

MAX. TIME: 1 Hour 30 Min

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Q1. Let $A = set\ of\ all\ positive\ integers$, $B = Set\ of\ all\ negative\ integers$.

Then prove or disprove that for the set of integers $Z, Z = (A - B) \cup (B - A)$ [2][CO3]

Q2. Suppose $F = \{\frac{p}{q} : p, q \in Z,\ q \neq 0\}$. Define a relation R on F as follows:

$$\frac{a}{b} R \frac{c}{d}\ iff\ ad = bc$$

Prove or disprove that R is an equivalence relation on F. [2][CO3]

Q3. Let $A = $ set of all even positive integers. Then show that the divisibility relation $|$ on A is a partial order. [2][CO3]

Q4. Using truth table check whether the following expression is a tautology or contradiction:

$$(p \vee q) \wedge (\sim p) \wedge (\sim q)$$ [2][CO1]

Q5. Test the validity of the following argument:

$$p \to q,\ q \to r,\ p \vee q \to r \vdash r$$ [2][CO1]

Q6. Write the equivalent expression for the following:

$$\sim [\forall x\ \forall y\ \exists z\ (x^2 + y^2 \geq z^2)]$$ [2][CO1]

Q7. Write the converse, and inverse of $p \to q$. Comment whether $p \to q$ is equivalent to its converse or not? [2][CO1]

Q8. Solve the recurrence relation using method of generating function

$$a_r - 7a_{r-1} + 10a_{r-2} = 0,\ with\ a_0 = 0\ and\ a_1 = 3, r \geq 2$$ [3][CO7]

Q9. (a) Draw the complete graph K_6

(b) Draw the complement of graph K_6

(c) How many edges will be there in complete graph K_{100} [1 X 3=3][CO4]

Q10.(a) Draw the complete bipartite graph $K_{3,4}$

   (b) For $K_{3,4}$ find degree of each vertex and show that sum of all degrees is twice the number

       of edges.

   (c) How many edges will be there in $K_{100,250}$.   [1 X 3=3][CO4]

Q11. (a) How many vertices will be there in Q_n

   (b) Draw the wheel graph W_6

   (c) Draw a 3-regular graph

   (d) Is every complete graph a regular graph   [0.5 X 4=2][CO4]