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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2026

BCA-II Semester/ B.Tech (Mathematics and Computing)-1 V Semester

COURSE CODE (CREDITS): 25B11MA213 (4)

MAX MARKS: 25

COURSE NAME: Discrete Computational Mathematics

COURSE INSTRUCTOR: NKT

MAX. TIME: 1 Hour 30 Min

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculator is not allowed

Q.No	Question	CO	Marks
Q1	If R be a relation in the set of integers Z defined by $R = \{(x, y) : x \in Z, y \in Z, (x - y) \text{ is divisible by } 6\}$ Show that R is an equivalence relation.	CO-1	3
Q2	Use generating function to solve the recurrence relation $a_k = a_{k-1} + 6a_{k-2}, k \geq 2, a_0 = 1 \text{ and } a_1 = 1$	CO-1	3
Q3	Let $A = \{1, 2, 3, 4, 6, 8, 9, 12, 18, 24\}$ be ordered by the relation 'x divides y'. a) Make the Hasse diagram b) Make the Join and meet table. Is the poset $(A,)$ lattice? c) Find the complements of each element if it exists	CO-2	5
Q4.	Prove that, If a lattice (L, \leq) is a bounded and distributive lattice, then the complement of an element is unique provided it exists.	CO-2	3
Q5	Write the converse, inverse and contrapositive of the statement If a triangle is not isosceles, then it is not equilateral.	CO-3	2
Q6	Show that the proposition $((p \rightarrow q) \rightarrow r) \Leftrightarrow ((p \rightarrow r) \vee (q \rightarrow r))$ is a tautology	CO-3	4
Q7	Check the validity of the argument 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.	CO-3	5