BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO/2024)

CLASS: B.TECH.
BRANCH: CSE/AIML

SEMESTER : III/ADD
SESSION : MO/2024

SUBJECT: MA205 DISCRETE MATHEMATICS

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

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			CO	BL
Q.1(a)	Construct a truth table for the compound proposition $(p \vee q) \rightarrow (p \wedge q)$.	[2]	1	3
Q.1(b)	Check whether $[(p \rightarrow q) \wedge (q \rightarrow r)] \rightarrow (p \rightarrow r) \equiv T$ or not.	[3]	1	4
Q.2(a)	If $p \rightarrow q$ is true, determine the truth value of $\neg p \wedge (p \rightarrow q)$.	[2]	1	3
Q.2(b)	Show that the premises $p \rightarrow q$, $q \rightarrow r$, $\neg r$ lead to the conclusion $\neg p$.	[3]	1	4
Q.3	Solve the recurrence relation $a_{n+2} - 6a_{n+1} + 9a_n = 3(2^n) + 7(3^n), n \geq 0$ given that $a_0 = 1$ and $a_1 = 4$.	[5]	2	4
Q.4	Use generating function to solve the recurrence relation $a_r = 8a_{r-1} + 10^{r-1}, r \geq 1$ with $a_0 = 1$.	[5]	2	4
Q.5	Use Warshall's algorithm to find transitive closure of the relation $R = \{(a,b),(b,a),(b,c),(c,d),(d,a)\}$ defined on the set $A = \{a,b,c,d\}$.	[5]	3	4

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