Semester II (B.Tech.)

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Er. No.....

Academic Year: 2021-22

Jaypee University of Engineering & Technology, Guna

T-1 (Even Semester 2022)

18B11MA211 – Discrete Mathematics

Maximum duration: 1 Hour

Maximum Marks: 1

Notes:

1. This question paper has four questions.
2. Write relevant answers only.
3. Do not write anything on question paper (Except your Er. No.).

			Marks
Q1.	(a)	Using Mathematical Induction, show that for a positive integer n; $11^{n+1} + 12^{2n-1}$ is always divisible by 133.	[4]
	(b)	Let A, B and C be the sets. Prove analytically and graphically that $(B - A) \cup (C - A) = (B \cup C) - A$.	
Q2.	(a)	Draw diagraph for relation R on $A = \{1,2,3,4,5,6,7,8\}$, where xRy if y is divisible by x.	[4]
	(b)	Let $A = \{1,2,3,\ldots.,9\}$ and let R be the relation on $A \times A$ defined by: $(a,b)\ R(c,d)$ if $a + d = b + c$ (i) Prove that R is an equivalence relation. (ii) Find $[(2,5)]$, i.e. the equivalence class of $(2,5)$.	
Q3.	(a)	A person deposits Rs1000 in an account that yields 9% interest compounded annually. (i)Set up a recurrence relation for the amount in the account at the end of n years. (ii)Find an explicit formula for the amount in the account at the end of n years. (iii)How much money will the account contain after 100 years?	[4]
	(b)	Write the domain of the following function: $f(x) = \sqrt{81 - x^2}$.	[3]
Q4.		Construct the truth table of the following: $[\sim p \wedge (\sim q \wedge r)] \vee (q \wedge r) \vee (p \wedge r)$	
		Write the dual of the following identity: $A \cup B = (A \cap B') \cup (A' \cap B) \cup (A \cap B)$	
