

Subject	B	C	A	-	2	0	7	T					Code:-
Subject:-	Discrete Mathematics												
Roll No:-													

**TECNIA INSTITUTE OF ADVANCED STUDIES**  
**BCA**  
**Internal Exam (2025-26)**

Sem: III<sup>rd</sup>

Set-2

Date: 

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Time: -1:30 Hours

Max. Marks: 30

**General Instructions:**

- All Questions are compulsory. Answers should be brief and to the point.
- It comprises three sections, A, B, and C. you are to attempt all the sections.
- **Section A** – Question No -1 is Very Short Answers type carrying 2 marks each. You are required to answer ALL.
- **Section B**- Question No-3 is Short Answers type question carrying 5 marks each. You are required to attempt any TWO out of THREE questions given.
- **Section C**- Question No -4 is Long Answer type question carrying 10 marks each. You need to attempt anyone.
- Students are instructed to cross the blank sheets before handing over the answer sheet to the invigilator.
- No sheet should be left blank. Any written material after a blank sheet will not be evaluated /checked.

		CO	BT	M
<b>SECTION –A</b>				<b>(10)</b>
<b>1.</b>	<b>Attempt All of the following.</b>			<b>(5*2=10)</b>
	<b>a.</b> Define Power set. What is the power set of {r,s,t,u}?	CO1	L1	
	<b>b.</b> Let A={1,2,3,4,5,6} and B={x: x∈A, x is even}. Find A-B.	CO1	L2	
	<b>c.</b> Let f : A → B and g : B → C be functions where A={1,2,3}, B={a,b,c} and C={x,y,z}, and f={{(1,a),(2,b),(3,c)}, g = {(a,x),(b,y),(c,z)}. Find g◦f and f◦g if possible.	CO1	L3	
	<b>d.</b> Construct the truth table for the compound statement (p∨q)∧(¬p).	CO2	L3	
	<b>e.</b> Let p: Sun revolves around Earth and q: 7>5. What will be the truth value of p∧q and p∨q.	CO2	L2	
<b>SECTION –B</b>				
<b>2.</b>	<b>Answer any Two of the following.</b>			<b>(2*5=10)</b>
	<b>a.</b> Define Poset. Draw the Hasse diagram for the poset (S;⊆), where S = {{1},{1,2},{1,2,3},{1,2,4},{1,2,3,4},{1,2,3,4,5}}. Identify the minimal and maximal elements.	CO1	L4	
	<b>b.</b> Prove that (A∪B) <sup>c</sup> =A <sup>c</sup> ∩B <sup>c</sup>	CO2	L5	
	<b>c.</b> Write the negation of the following quantifier statements and express them in words: I. ∀x (x <sup>2</sup> > 0) II. ∃x (x + 5 = 0)	CO2	L3	

	III. $\forall x (x > 0 \rightarrow x^2 > 0)$ IV. $\exists x (x^2 = 2)$ V. $\exists x (x^2 < 12)$			
<b>SECTION –C</b>				
<b>3.</b>	<b>Answer any <u>One</u> of the following.</b>			<b>(1*10=10)</b>
<b>a.</b>	Let $A = \{1,2,3,4,5,6\}$ . Define a relation R on A as $R = \{(x,y) : x-y \text{ is divisible by } 2\}$ . Show that R is an equivalence relation. Find the equivalence classes.	<b>CO1</b>	<b>L5</b>	
<b>b.</b>	Prove that I. $p \rightarrow (q \vee r) \equiv (p \rightarrow q) \vee (p \rightarrow r)$ . II. $\sim(p \leftrightarrow q) \equiv \sim p \leftrightarrow q \equiv p \leftrightarrow (\sim q)$	<b>CO2</b>	<b>L6</b>	