BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
B. Tech. Sem - III Computer Science & Business Systems : SUMMER : 2025
SUBJECT: FORMAL LANGUAGE & AUTOMATA THEORY

Day : Tuesday
Date : 13/05/2025

S-24142-2025

Time : 02:30 PM-05:30 PM
Max. Marks : 60

N.B.

1) All questions are **COMPULSORY**.
2) Figures to the **RIGHT** indicate **FULL** marks.
3) Assume suitable data **WHEREVER** necessary.
4) Draw neat diagrams **WHEREVER** necessary.

Q.1 Describes the relationship between graphs and trees with proper diagram. **(10)**

OR

Q.1 Define the following terms with example **(10)**
i) Language
ii) Complete Bipertite Graph.

Q.2 Design DFA which accepts set of strings such that every string containing 00 as substring but not 000 as substring. **(10)**

OR

Q.2 Minimize the following DFA. **(10)**

	0	1
$\rightarrow q_0$	q_1	q_0
q_1	q_0	q_2
q_2	q_3	q_1
q_3*	q_3	q_0
q_4	q_3	q_5
q_5	q_6	q_4
q_6	q_5	q_6
q_7	q_6	q_3

Q.3 State and explain in detail the closure properties of regular sets. **(10)**

OR

Q.3 Explain the following terms with example. **(10)**
i) Unit production
ii) Nullable non terminal
iii) Elimination of ε – production.

Q.4 Convert the following Grammar to CNF. **(10)**

$S \rightarrow ABB$
$A \rightarrow aAS \mid a \mid \varepsilon$
$B \rightarrow SbS \mid A \mid bb$

OR

Q.4 Design Turing Machine which accepts all strings of the form $a^n b^n$ for $n \geq 1$ and rejects all other strings. **(10)**

Q.5 Design Turing Machine that replaces string 110 by 101 in binary input string. **(10)**

OR

Q.5 Classify the Church Turing thesis with example. **(10)**

Q.6 Explain in detail Np complete problem. **(10)**

OR

Q.6 Describes cooks theorem in detail. **(10)**

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2025-cbcs-mumbai