



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech II Semester End Examinations (Regular/Supplementary) - May, 2018

Regulation: IARE – R16

THEORY OF COMPUTATION

Time: 3 Hours

(Common to ECE | EEE)

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT – I

1. (a) Compare NFA, DFA and Epsilon NFA [7M]
(b) Design a DFA to accept all binary strings whose decimal values are divisible by 4. [7M]
2. (a) Convert the following ϵ -NFA to DFA [7M]

Table 1

	ϵ	A	b	c
$\rightarrow p$	{q}	{P}	ϕ	ϕ
q	{r}	ϕ	{q}	ϕ
*r	ϕ	ϕ	ϕ	{r}

- (b) Design NFA for recognizing C Programming language key words such as else, while, for, if, end, int, float. [7M]

UNIT – II

3. (a) Construct the NFA for the regular $((a^*+b^*)(a+b))^*$ [7M]
(b) Write the regular expression to recognize the valid PAN number [7M]
4. (a) Describe the closure properties of Regular Languages [7M]
(b) Write the right linear grammar for the regular expression $(0+1)^*01$ [7M]

UNIT – III

5. (a) Give the context free grammar for the following language: $L = \{a^n b^m c^m d^n : n, m \geq 0\}$ [7M]
(b) Is the following grammar in CNF? If not convert the following grammar into CNF: $E \rightarrow E + T \mid F, T \rightarrow T * F \mid F, F \rightarrow (E) \mid a$ [7M]
6. (a) Consider the Grammar $G=(V, T, E, P)$ with the following productions
S \rightarrow AaBC
B \rightarrow bB \mid bAB \mid b
C \rightarrow Cb \mid b
A \rightarrow aA \mid a
Write the leftmost and rightmost derivation and parse tree for the string belongs to the L(G). [7M]

(b) Minimize the following Context free grammar

$S \rightarrow aBa \mid Aa$

$B \rightarrow abC \mid D$

$C \rightarrow aaC \mid c$

$E \rightarrow ab \mid Ab \mid b$

[7M]

UNIT – IV

7. (a) Convert the following grammar to a PDA $E \rightarrow E + T \mid F, T T^* F \mid F, F \rightarrow (E) \mid a$ [7M]

(b) Compare D{DA and NPDA. Give one example for each [7M]

8. (a) Explain the following i) PDA accepting through empty stack ii) PDA Accepting through final state [7M]

(b) Design a PDA to accept a $aL = w cw^R \mid w(0+1)^* and w^R$ is the reverse of w [7M]

UNIT – V

9. (a) Define a Turing machine and explain its working principle. [7M]

(b) Design a Turing machine that will accept the language L over $\{a, b\}$ where $L = L = \{a^n b^n\}$ [7M]

10. (a) Write a note on Multidimensional Turing machines [7M]

(b) Define the following with an example: i) Recursively enumerable languages ii) Recursive languages [7M]

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