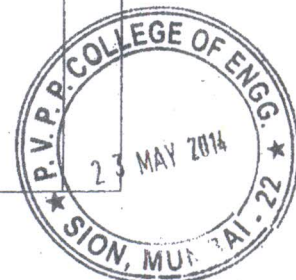


(3 Hours)

[Total Marks :80]

- N.B. (1) Question No. 1 is **Compulsory**.
 (2) Attempt any **three** questions out of remaining questions.
 (3) Figures to the right indicate full marks.
 (4) Assumptions made should be clearly stated.
 (5) Assume suitable data wherever required and justify it.

1	(a) What is a network? What are its goals and applications?	05
	(b) Discuss and compare various types of networks.	05
	(c) Is there any relationship between transmission media and topology?	05
	(d) What are the goals of TCP/IP Model?	05
2	(a) What is OSI Model? Explain the functions and protocols and services of each layer.	10
	(b) Describe about the different Guided transmission Medias.	10
3	(a) Explain the functions of data link layer.	10
	(b) Explain the Taxonomy of multiple access protocols.	10
4	(a) Explain different categories of routing algorithms.	10
	(b) What is IP addressing? How it is classified? How is subnet addressing is performed.	10
5	(a) What are the elements of transport protocols?	10
	(b) Explain TCP Congestion Control.	10
6	Write short notes on (any 4):- a) Connection oriented and connectionless service. b) Sliding window protocol. c) Mobile Telephone system. d) Communication Satellite e) Internet Control protocols. f) UDP	20





A.T.

QP Code : NP-19812

(3 Hours)

[Total Marks : 80

- N.B. :** (1) Question No. 1 is **compulsory**.
 (2) Solve any **three** questions from remaining questions.
 (3) **Draw suitable diagrams** wherever **necessary**.
 (4) Assume suitable **data**, if **necessary**.

1. (a) Design a DFA to accept strings over the alphabet $\Sigma = \{a, b\}$ containing even number of 'a's. 5
 (b) Let G be the grammar. Find the leftmost derivation, rightmost derivation and parse tree for the expression a^*b+a^*b 5
- G: $S \rightarrow S + S \mid S * S$
 $S \rightarrow a \mid b$
- (c) Give formal definition of a Push Down Automata (PDA) 5
 (d) State and explain closure properties of regular languages. 5
2. (a) Design a DFA to accept 10
 (i) Binary strings in which every 0 is followed by 11
 (ii) Strings over the binary alphabet that do not contain the substring 010
- (b) Design a Mealy machine over the alphabet $\{0,1\}$ which outputs EVEN, ODD according to the number of 1's encountered as even or odd. 10
3. (a) (a) Using pumping lemma prove that the following language is not regular 10
 $L = \{ ww \mid w \in \{0, 1\}^* \}$
 (b) Design a NFA for accepting input strings that contain either the keyword 000 or the keyword 010 and convert it into an equivalent DFA. 10
4. (a) Construct a PDA accepting the following language $L = \{ a^n b^m a^n \mid m, n \geq 1 \}$ 10
 (b) Design a Turing machine to recognize the language $L = \{ a^n b^n \mid n \geq 1 \}$ 10



QP Code : NP-19812

2

5. (a) Explain algorithm for the conversion of a Context Free Grammar (CFG) to Chomsky Normal Form (CNF) and use it to convert the following CFG to CNF 10
 $S \rightarrow bA \mid aB$
 $A \rightarrow bAA \mid aS \mid a$
 $B \rightarrow aBB \mid bS \mid b$
- (b) Convert the following Context Free Grammar to GNF 10
 $S \rightarrow AB \mid BC$
 $A \rightarrow AB \mid a$
 $B \rightarrow AA \mid CB \mid b$
 $C \rightarrow a \mid b$
6. Write short notes on (any two) 20
(a) Variants of a Turing Machine
(b) Post Correspondence Problem
(c) Chomsky Hierarchy
(d) Recursive and recursively enumerable languages.
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Con. 12999-14.

