Name:

Enrolment No:

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2019

Course: FORMAL LANGUAGES AND AUTOMATA THEORY

Semester: III

Program: B.Tech (CS+All IBM courses)

Time : 03 hrs.

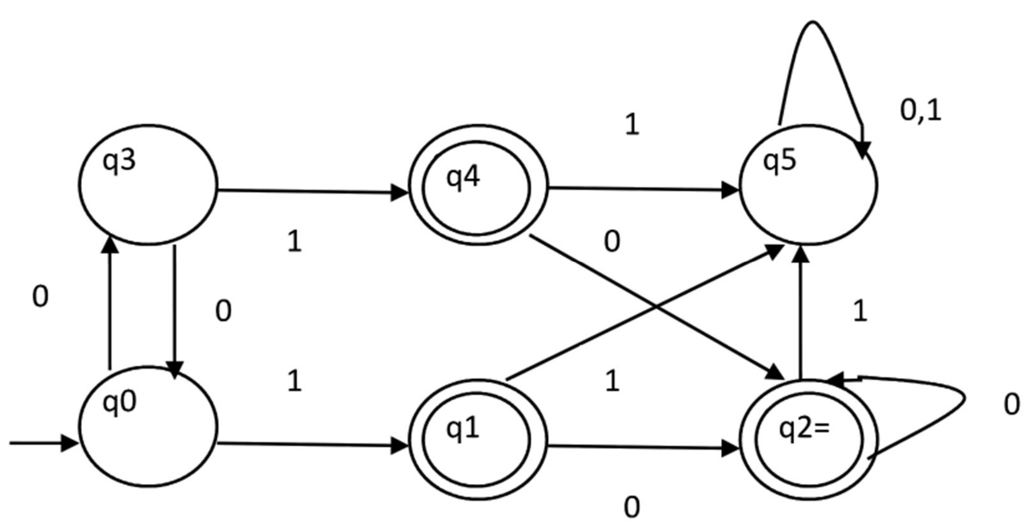
Course Code: CSEG 3004 **Max. Marks: 100**

Instructions:

SECTION A

S. No.		Marks	CO
Q 1	Construct RE where, L={$a^m b^n$ | m+n=odd and $\|w\|_n$>2}	**4**	**CO2**
Q 2	Design CFG for L={$a^m b^n c^k$,n=|m-k|}	**4**	**CO3**
Q 3	Design Minimum DFA {w: na(w)mod3>nb(w)mod 2,w €$(a+b)^*$}	**4**	**CO1**
Q 4	Construct Regular grammar for the language having input symbol ∑=(a,b), and length of string is even.	**4**	**CO2**
Q 5	Explain closure properties of Recursive Enumerable Language under Intersection, Union, Concatenation and Complementation	**4**	**CO4**

SECTION B

Q 6.	Minimize following DFA using Myhill-Nerode Theorem 	**10**	**CO2**

Q 7.	Explain Chomsky classification of Grammar with example. **OR** Use the pumping lemma to show that following languages are not context free. L1: $\{a^i b^j \ / \ j=i^3\}$	**10**	**CO1**
Q 8.	Simplify given grammar and Convert to CNF G2 = {S->aA|bB, B->bB|ε, A->aA|ε}	**10**	**CO3**
Q 9.	For S ∈ (0 + 1) * let d(s) denote the decimal value of s (e.g. d(101) = 5). Let L = {s ∈ (0 + 1)* d(s)mod5 = 2 and d(s)mod7 != 4}. What is the type of language L? Explain.	**10**	**CO2**
SECTION-C			
Q 10	Design a non -deterministic PDA for accepting the language $L = \{ww^R \ w \in (a+b)^+\}$.	**20**	**CO3**
Q 11	Construct a Turing Machine for language L = {ww | w ∈ {0,1}} **OR** Construct a Turing machine for $L = \{a^n b^n a^n \mid n>0\}$	**20**	**CO4**