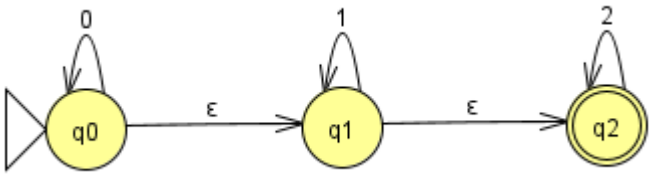
Duration: 3hrs **Marks:80**

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1		Attempt any FOUR	[20]
	a	Prove by Mathematical Induction that 3^n-2n-1 is divisible by 4	[05]
	b	Explain Reflexive and Transitive Relation with Suitable Example.	[05]
	c	Explain Mealy and Moore Machine with Example.	[05]
	d	Define regular expression and Describe it's any two properties	[05]
	e	Define Pushdown Automata. What are the different types of PDA? What are the application of PDA?	[05]
2	a	Give an Example of Graph which is 1) Eulerian and Hamiltonian, 2) Eulerian but Not Hamiltonian, 3) Hamiltonian but not Eulerian, 4) Neither Hamiltonian not Eulerian	[10]
	b	Construct the digraph and the Hasse diagram for the poset (A, |) where A = {1,2,3,4,6,8} and | denote the divisibility Relation.	[10]
3	a	Define and give Example of Injective, Surjective & Bijective function.	[10]
	b	Transform the following formula into Conjunctive Normal Form ~(p→q) V (r→ p).	[05]
	c	Construct truth table to determine whether the given statement is tautology, contradiction or neither. (q ^ p) V (q ^ ~p)	[05]

4 a Convert the given ε NFA to NFA. [10]



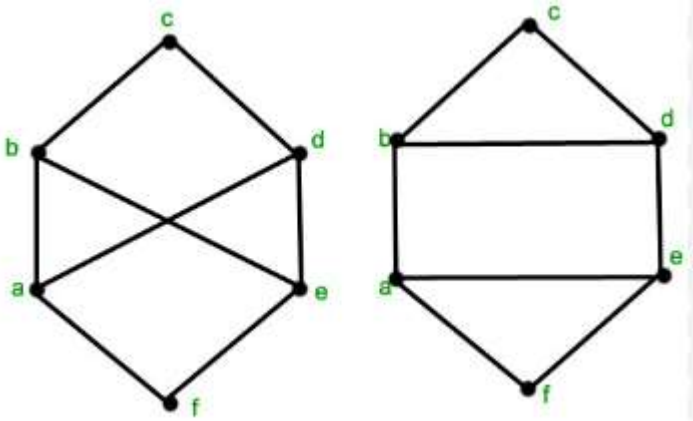
b Write a short notes on Types of Grammar. [10]

5 a Construct a DFA that accept the Language represented by 0*1*2*. [10]

b Write a short note on Myhill- Nerode theorem. [10]

6 a Design a FA from given regular expression 10 + (0 + 11)0* 1.with proper explanation of all steps. [10]

b State the condition of Graph Isomorphism. Determine whether the following Graphs are Isomorphic or not with all Suitable condition. [10]



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