**SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY, THIRUPACHUR**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**INTERNAL ASSESSMENT-1**

**PART-A (2\*7=14)**

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| 1.Define Finite Automata (FA) | (2) | BTL 1 | **CO1** |
| 2. Construct a DFA for the language over {0, 1}\* such that it contains “000” as a substring. | (2) | BTL 3 | **CO1** |
| 3. State the difference between NFA and DFA. | (2) | BTL 1 | **CO1** |
| 4. Design DFA to accept strings over ∑ = (0,1) with two consecutive 0’s. | (2) | BTL 3 | **CO1** |
| 5. Construct a DFA that accepts input string of 0,s and 1’s that end with 11. | (2) | BTL 3 | **CO1** |
| 6. What is induction principle? Give an example. | (2) | BTL 1 | **CO1** |
| 7. Construct a finite automata for the language {0n | n mod 3 = 2, n ≥ 0}. | (2) | BTL 1 | **CO1** |

**PART-B13\*2=26 MARKS)**

|  |  |  |  |
| --- | --- | --- | --- |
| 8.a)(i)Prove by induction on n that  (ii)Prove that 12 + 22 + 32 + ... + n2 = Σni=1 i2 = n(n + 1) (2n + 1)/6 using mathematical induction. | (6)  (7) | BTL 3  BTL 3 | CO1  CO1 |
| (OR) |  |  |  |
| 8.b)*Convert the given NFA with ɛ to NFA without ε.*  https://www.poriyaan.in/media/imgPori/images52/nXzzmrj.jpg | (13) | BTL 3 | CO1 |
| 9.a)Convert an NFA to a DFA given NFA M = (Σ,Q,δ,q0, F) Σ={0,1},  Q = { q0, q1, q2 ,q3},F= { q0}, | (13) | BTL 3 | CO1 |
| (OR) |  |  |  |
| 9.b)Construct minimized automata for the following automata to define the same language.  a b  🡪q0 q1 q0  q1 q0 q2  q2 q3 q1  \*q3 q3 q0  q4 q3 q5  q5 q6 q4  q6 q5 q6  q7 q6 q3 | (13) | BTL 3 | CO1 |
| PART-C(10\*1=10 MARKS) |  |  |  |
| 10.a)Prove that, if L is accepted by an NFA with ε-transitions, then L is accepted by an NFA without ε-transitions. | (10) | BLT 2 | CO1 |
| (OR) |  |  |  |
| 10.b)Construct an NFA without ε-transitions for the NFA give below.  0 1  ε | (10) | BLT 3 | CO1 |