

## MTL783: Theory of Computation

### Quiz 2

Writing Time: 50 minutes

Total Marks: 14

Maximum Marks: 12.5

~~Q1.~~ Prove that  $L = \{a^n : n > 0\}$  is not Regular using Pumping Lemma.

[3]

~~Q2.~~ Let  $L_1 = \{a^{2k}b^{3j} : k, j > 0\}$  and  $L_2 = \{a^{3k}b^{2j} : k, j > 0\}$ .

- (i) Find the language  $L_1 \cap L_2$ .
- (ii) Prove or disprove if it is Regular.

[1+2 = 3]

~~Q3.~~ (a) Prove or Disprove:  $L = \{a^n b^m : n \leq 50 \text{ and } m \geq 100\}$  is Regular.

~~(b)~~ Can you draw an Automata (Not necessarily FSA) to accept this language?

[2+2=4]

Q4. Consider the problem of counting the number of occurrences of the substring "ab" in any string  $w \in (a|b)^*$ . The number will be counted as the number of 1's present in the output string of  $(0|1)^*$ .

- ~~(i)~~ Design it as Moore Machine.
- (ii) Convert the above into a Mealy Machine

[2+2=4]