Dept of CSE, DU
CSE 3203, 2017
In-course Exam

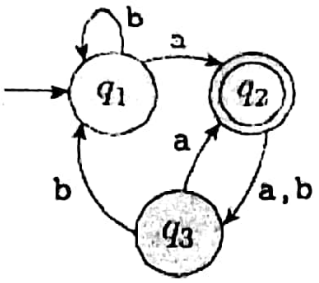
TIME 1 hour 30 minutes
Total Marks: 30

Answer the following questions.

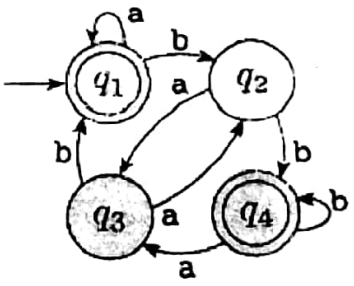
1. a. Consider the following language ($\Sigma = \{0,1\}$) 5
L={w | *the number of zeros in w is less than the number of ones*}
Use pumping lemma to prove that L is not regular.

b. Let, A be a language and $NoPrefix$ is an operation on A as defined below: 5
$NoPrefix(A) = \{w \in A | no\ proper\ prefix\ of\ w\ is\ a\ member\ of\ A\}$
Prove that the class of regular language is closed under the operation $NoPrefix$.

2. a. Consider the following DFAs. 3+3



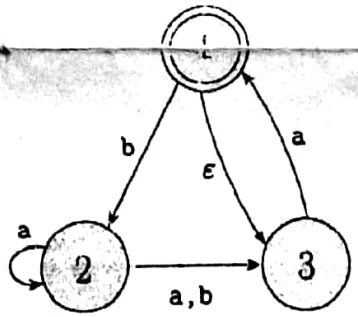
M_1



M_2

Draw finite state machines that accept the following languages
i. $L(M_2) - L(M_1)$
ii. The reverse language of $L(M_2)$

b. Consider the following NFA. 4



Draw the **DFA** that accepts the **complement** of the language accepted by the above NFA.

3. a. Draw the **minimum** state DFA for the following language. ($\Sigma = \{a, b\}$) 4+2
{w|w has an even number of a's and each a is followed by at least one b }

b. Consider the following CFG with start symbol E. 2+2

$$E \rightarrow I|E + E|E * E|(E)$$
$$I \rightarrow a|b|Ia|Ib|I0|I1$$

Show the leftmost and rightmost derivation of the string $(a1 * (b0 + a10))$ using the above grammar.