

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-1 EXAMINATION- SEPTEMBER, 2019

M. Tech I Semester

COURSE CODE: 15M1WCI331

MAX. MARKS: 15

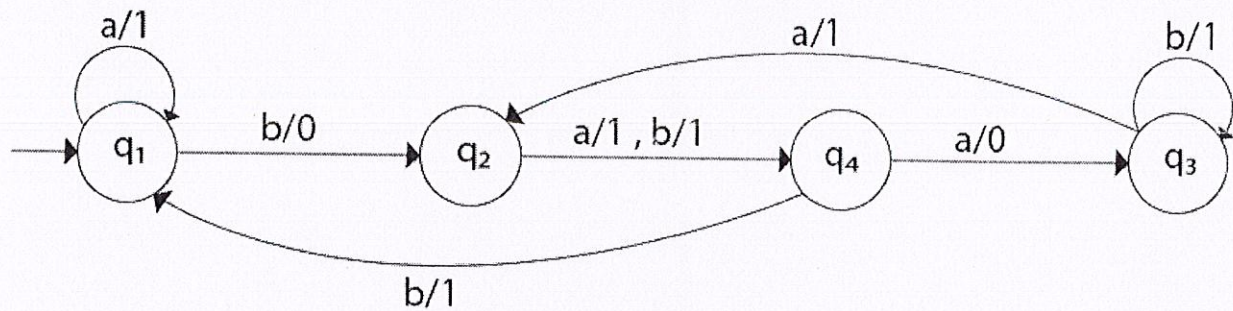
COURSE NAME: Advanced Theory of Computation

COURSE CREDITS: 3

MAX. TIME: One Hour

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

1. Use induction to prove that every positive integer can be written as a product of prime numbers. [3 marks]
2. Prove by induction that $n^4 - 4n^2$ is divisible by 3, for all integers $n - 1$. [3 marks]
3. Convert the following Mealy machine into equivalent Moore machine and provide a transition diagram after conversion. [7 marks]



4. Is the implication $(P \wedge (P \Rightarrow \neg Q)) \vee (Q \Rightarrow \neg Q) \Rightarrow \neg Q$, a tautology? [2 marks]