

## JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- October 2017

M.Tech (CSE) III Semester

COURSE CODE: 15M1WCI331

MAX. MARKS: 25

COURSE NAME: Advanced Theory of Computation

COURSE CREDITS: 3

MAX. TIME: 1Hr 30 Min

---

*Note: All questions are compulsory.*

---

1. [5 Marks]

Imagine a traffic light. Let  $\Sigma = \{a\}$ . In other words, the input consists just of a string of a's. Think of each a as the output from a timer that signals the light to change. Construct a deterministic finite state transducer whose outputs are drawn from the set  $\{Y, G, R\}$  (corresponding to the colors yellow, green, and red). The outputs of the transducer should correspond to the standard traffic light behavior.

2. [5 Marks]

Prove or disprove:

- There is a polynomial algorithm which, given a deterministic finite automaton, constructs an equivalent deterministic finite automaton with the smallest possible number of states.
- A language is regular if and only if it is accepted by a finite automaton.

3. [5 Marks]

- Give an example of a graph for which APPROX-VERTEX-COVER always yield a suboptimal solution.
- What language is accepted by the following finite state automaton shown in Figure 1?