

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-1 EXAMINATION SEP 2017

M.Tech (CSE) III Semester

COURSE CODE: 15M1WCI331

MAX. MARKS: 15

COURSE NAME: Advanced Theory of Computation

COURSE CREDITS: 3

MAX. TIME: 1 Hr

Note: All questions are compulsory.

1. [5 Marks]

- a. Let $R = \{(a, b), (a, c), (c, d), (a, a), (b, a)\}$. What is $R \circ R$, the composition of R with itself? What is R^{-1} , the inverse of R ? Is R , $R \circ R$, or R^{-1} a function?
- b. What is the reflexive transitive closure R^* of the relation $R = \{(a, b), (a, c), (a, d), (d, c), (d, e)\}$. Draw a directed graph representing R^* .

2. [5 Marks]

Formulate a decision problem for the independent set problem, and prove that it is NP-complete.

3. [5 Marks]

Prove or disprove: HAMILTON CYCLE is NP-complete.

CI-21, MT