

Roll Numer:

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST 3 EXAMINATIONS - DECEMBER 2017

Ph.D., IInd Semester (Course work))

COURSE CODE: 151WPH213

MAX. MARKS: 35

COURSE NAME: Semiconducting Luminescent Materials

COURSE CREDITS: 03

MAX. TIME: 2.0 HRS

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

Q.1. Explain radiative transitions in pure and doped semiconductors. [5]

Q.2. Discuss recombination processes in AlN for [5]

- (i) Free and bound exactions and;
- (ii) Band to impurity transitions.

Q.3. What is a quantum dot, discuss with reference to density of states? What is the electronic structure and application of quantum dots? [5]

Q.4. Discuss single molecule and single quantum dot fluorescence spectroscopy. [5]

Q.5. Explain interfacial electron transfer on single semiconductor nanoparticles by considering the special case of TiO₂. [5]

Q.6. Which nanomaterials and structures can be used for biological applications? Discuss the solubilization and functionalization processes in order to use nanostructures in biological applications. [5]

Q.7. Discuss any two applications of quantum dots in biology along with the toxicity concern of the quantum dots. [5]