JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
T-2 EXAMINATION- OCTOBER 2018
Ph.D I Semester

Dr. Hazra

COURSE CODE: 13P1WPH113

MAX. MARKS: 25

COURSE NAME: ADVANCED MATERIALS SCIENCE

COURSE CREDITS: 03

MAX. TIME: 1.5 Hrs

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

Q1. Answer briefly: [1×5=5-marks]

a. What is the cause of strain in material?

b. Obtain the edge length ratio (c/a) in a hexagonal close packed lattice?

c. How spontaneity of a chemical reaction is determined?

d. What is the basis of Arrhenius rate equation?

e. What is the cause of bonding in solids?

Q2. What is homogeneous nucleation? Elaborate with the concept of supersaturation the nucleation and growth mechanism in zero dimensional nanoparticles. **[5-marks]**

Q3. Write short notes: [2.5×2=5-marks]

a. Parametric control in thin film growth by sol-gel technique.

b. Capacitance-Voltage (C-V) measurements.

Q4. (i) How to use physical vapor deposition technique to generate nanostructure on a substrate? (ii) Obtain an expression for the carrier concentration in terms of built in voltage in a p-n junction.

[2.5×2=5-marks]

Q5. In BJT n-p-n or p-n-p devices, explain the significant physical characteristic of the base. How will you fabricate a silicon n-p-n transistor? **[5-marks]**