

Dr. Raju

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-1, EXAMINATION – 2016
B.TECH(BT)/IV SEMESTER

COURSE CODE: 10B11PH212

COURSE NAME: BIO-PHYSICAL TECHNIQUES

COURSE CREDITS: 04

MAX. MARKS: 15

MAX TIME: 1 Hr

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

Q.1. A molecule in space can have how many forms of energy? Explain with the help of the diagrams? **2**

Q.2. compute the coordination number, nearest distance between lattice points and packing fraction for the face centered cubic crystal? **2**

Q.3. Draw and explain the anatomy of the XRD pattern. What we can determine using XRD data? **3**

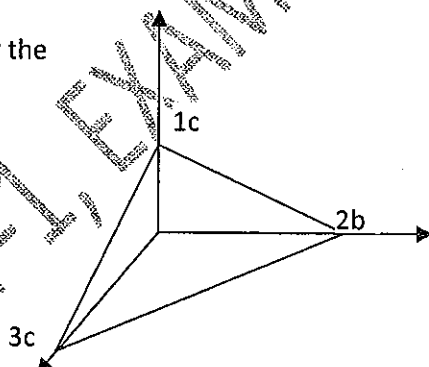
Q.4. Write short notes on **2**

(a) Molecular spectroscopy (b) Name the essential parts of the diffractometer

(c) Powder diffraction (d) Give equation for a^* and b^* for a reciprocal lattice

Q.5. Solve all the problems:

(a) Find the Miller indices for the **1**



(b) The lattice constants of a fcc structure is 4.25\AA . Calculate the surface density of atoms for a (a) (100) plane and (b) (110) plane. Draw the related figures. **2**

(c) Calculate the d-spacings for the planes (100), (001) and (111) in a crystal with unit cell $a=7\text{\AA}$, $b=8\text{\AA}$ and $c=9\text{\AA}$. **1**

(d) Calculate the strain and the particle size for the given data **2**

Sample#	Peak Position(2θ)	FWHM(2θ)	d-spacing
1	28.2337	4.3296	3.16087
2	26.5602	0.9840	3.35611