

Applied Physics I

Internal Test 1

SEM I 7 Sept 2015

ODD ROLL NO.

Time-Duration- 1 Hour

Maximum Marks- 15

**All Questions are compulsory****Q. 1: Attempt any Three**

3x3=9

- (a) Explain the co-ordination no. for ZnS. Determine Miller Indices of plane parallel to c-axis and cut intercepts of 2 and 2/3 along a and b axis respectively.
- (b) Determine c/a ratio for hexagonal closed pack structure.
- (c) Derive the critical radius ratio for ligancy 6.
- (d) A monochromatic beam of X rays of wavelength  $1.4 \text{ \AA}$  is found to be Bragg reflected from the (111) plane of an FCC structure. If the lattice parameter of the crystal is  $5 \text{ \AA}$ , find the angle at which the X ray is incident on the (111) plane of the crystal for the first order reflection.
- (e) Ni has FCC structure. Its lattice constant is  $3.52 \text{ \AA}$ , atomic weight is 58.71. Calculate its radius, APF and density.

**Q. 2: Attempt any Two**

2x3=6

- (a) Explain what happens when ultrasonic waves are passed through liquid.
- (b) Explain Magnetostriction effect. Why it is observed in ferromagnetic materials only.
- (c) The ultrasonic pulse echo method is used with a cracked and a pure steel bar of thickness 90 cms. If pulse arrival time is 1 microsecond and 3 microseconds respectively, locate the distance at which the crack has occurred.

$$\cos \alpha = \frac{r_c}{r_{\text{ion}} r_c}$$