JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2016

B.Tech. (ECE, CSE & IT) 2$^{nd}$ Semester

COURSE CODE: 10B11PH211                                                MAX.MARKS : 25

COURSE NAME: PHYSICS-II

COURSE CREDITS: 04                                                     MAX. TIME: 1 Hr 30Min

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

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**Q1. a)** Derive Clausius Clapeyron's latent heat equation. Explain on the basis of this equation why the melting point of ice decreases and that of wax increases with increase in pressure?

[4]

**b)** Calculate the change in temperature of boiling water when the pressure is increased by *27.12 mm of Hg*. The normal boiling point of water at atmospheric pressure is *100$^0$C*. Given latent heat of steam is *537 cal/gm* and specific volume of water & steam is *1 cm$^3$* and *1674 cm$^3$* respectively.

[2]

**Q2. a)** Write the general boundary conditions for electrostatic fields at an interface between (a) free space & a conductor (b) Two different dielectric media?

[2]

**b)** A positive charge Q is at the center of a spherical conducting shell of an inner radius $R_i$ and an outer radius $R_o$. Determine **E** and V as a function of R for three regions i) R> R$_o$ , ii) $R_i$ <R<$R_o$ and iii) $R < R_i$.

[3]

**Q3.** Determine **E** field both inside and outside a spherical cloud of electrons with uniform volume charge density $\rho = - \rho_o$ for $0 \leq R \leq b$ and $\rho = 0$ for *R>b* by solving Poisson's and Laplace's equations for V.

[4]

**Q4. a)** Deduce the equation for propagation of electromagnetic waves in free space. Show that the electric and magnetic vectors are normal to each other and to the propagation of wave.

[2.5+2.5]

**b)** Using the expression of electromagnetic energy density derive Poynting's theorem and give the physical significance of each term involved.

[3+2]