JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-1 EXAMINATION – February 2020

B.Tech. IInd Semester

COURSE CODE: 18B11PH211   MAX. MARKS: 15

COURSE NAME: Engineering Physics II

COURSE CREDITS: 3   MAX. TIME: 1HR

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

Q.1. Obtain the following: [1+1+2] CO2

   (a) Relation $\mathbf{D}=\varepsilon\mathbf{E}$ in a polarized medium.

   (b) Relation $\mathbf{E_{1n}}/\mathbf{E_{n2}} = \varepsilon_2/\varepsilon_1$ if there is no free charge between the medium 1 and 2.

   (c) A Lucite sheet (ε_r=2.3) is introduced perpendicularly in a uniform electric field $\mathbf{E_o}=\mathbf{a_y}E_o$ in free space. Determine $\mathbf{E_i}$, $\mathbf{D_i}$ and $\mathbf{P_i}$ where subscript 'o' represents outside and 'i' represents inside the dielectric.

Q.2. Given $\mathbf{F} = \mathbf{a_x}\ xy - \mathbf{a_y}\ 2x$, verify Stokes theorem over a quarter circular disk with a radius 3 in the first quadrant.   3[CO1]

Q.3. A hollow spherical shell carries a charge density $\rho=k/r^2$ in the region a $\leq$r $\leq$b. Find the electric field in the three regions (a) r < a; (b) a < r < b and (c) r>b.   4[CO1]

Q.4. A sphere of radius R carries a charge density ρ=kr. Find the electrostatic potential energy.   4[CO2]