** Darbhanga College of Engineering**

**(**Established under AICET Act,)

**Department of Physics**

**221101 Engineering Physics**

**Assignment I**

1. A parallel plate capacitor of plate area *A* and the distance *d*  between  plates has a dielectric with dielectric constant k filling up the space between the plates.  If the plates are connected to a battery with voltage V, what is the energy stored in the capacitor? The dielectric is now slowly pulled out of the capacitor while keeping the battery connected. What is the energy stored when half the dielectric still remains within the capacitor? The battery is now disconnected and the dielectric is completely pulled out. What is the energy stored now?
2. A spherical capacitor of inner radius R and outer radius 3R has a concentric layer of dielectric with dielectric constant k filling the space between R and 2R. Find the capacitance.
3. A monochromatic laser beam has uniform intensity over a circular area of radius 0.2 mm. If total power of the beam is 96mW, find the magnitude of the magnetic field in the beam. If the circular area totally reflects the light, what is the radiation pressure on the area?
4. A  point source of plane electromagnetic wave having a wavelength of 3 m, has a power output of 750 W. Find the radiation pressure on a surface at a distance of 10 cm from the source assuming that the surface on which the radiation falls is perfectly reflecting.