Daffodil International University

Department of CSE

Faculty of Science & Information Technology

Final Examination **Semester: Fall-2019**

Course Code: PHY-113 **Course Title: Basic Physics**

Level & Term: L1-T1 **Section: All** **Course Teacher: All**

Time- 2hrs *Answer any five including question-1 from the followings* *Marks-40*

1.Answer the followings: 8.0

(a) What is an alternating current (AC)?
(b) What is dielectric constant?
(c) What is electric charge?
(d) What is stationary or standing wave?
(e) What do you mean by transverse wave?
(f) Draw the symbol of resistor, capacitor, inductor and cell (battery).
(g) What is steady current?
(h) Write the name of four goods in your house which run by alternating current.

2.a) Drive the equation for plane progressive wave? 4.0

b) A simple harmonic wave of amplitude 8 units traverses a line of particles in the direction of the positive x-axis. At any instant of time for a particle at a distance of 20cm the displacement is 6 units and for a distance of 25 cm the displacement is 5 units. Calculate the wavelength. 4.0

3.a) What are electric capacitor and capacitance? Find the equation for equivalence capacitance in series connected capacitors. 4.0

b) An isolated sphere has capacitance given by $C = 4\pi\varepsilon_o R$. The energy U stored in a capacitor depends on the capacitor's charge q and capacitance C. Find the energy stored in the capacitor when charge is 1.25×10^{-9}C and R = 6.85 cm. (R is the radius of spherical capacitor) 2.0

c) What are dielectric material. Give some examples. 2.0

4.a) State and explain Coulomb's law? Find the amount of 1 coulomb charge? Define current density. 4.0

b) What is an electrostatic force? Find the separation between two point charges of 2×10^{-8} C and 5×10^{-8}C when they create force 3.6×10^{-6} N with each other. 4.0

5.a) State and explain Biot-Savart law. 3.0

b) What is magnetic force on moving charge? Find the magnetic field at a space when a charge particle of 3.2×10^{-8} C moves in a region of magnetic field at an angle of 60^0, observe a force of 3×10^{-3} N. The velocity of the charge particle is 6.4×10^5 m/s. 3.0

c) Define Faraday's law of electromagnetic induction. 2.0

6.a) What is an electric dipole? Find the electric field at a point due to a dipole. 5.0

b) What is electric potential? At what distance from a charge of 3×10^{-8} C, the electric potential is 10 V. 3.0

7. a) State and explain Ohm's law. What are resistivity and conductivity of a conductor? 4.0

b) Draw V-I curve for conductor, semiconductor and insulator material. Find the internal resistance of battery of 22 volts which connected in a circuit of circuit resistance is 10 ohm. The current measured in this circuit is 2.15 amp. 4.0

($\varepsilon_0 = 8.854\times10^{-12}$ c^2/N-m^2, $\mu_0 = 4\pi\times10^{-7}$ weber/m^2, 1Å= 10^{-10}m, C = 3.0×10^8m/s, 1amu = 931 MeV.1eV = 1.6×10^{-19} joules, mass of e = 9.1×10^{-31} kg, charge of e = 1.6×10^{-19} couls. Avogadro number = 6.023×10^{23}, Plank's constant h = 6.67×10^{-34} J-S)