Daffodil International University

Department of Civil Engineering

Faculty of Engineering

Final Examination, Summer 2021 @ DIU Blended Learning Center

Course Code: Phy101 Course Title: Physics-I

Level: 1 Term: 1 Section: All

Instructor: MMI Modality: Open Book Exam

Date: Saturday 4th September, 2021 Time: 07:00am-10:30am

Three and half hours (3:30), Marks: 40

Answer any(5) from the following questions: **2+2+4**

1.a) Describe how Einstein's idea of a particle of radiation explains the photoelectric effect.

b) Do houses use DC or AC?Explain.

c) Calculate the avg. mean value of an alternating current for the third negative half cycle.

2. a) Should an atomic bomb really be called nuclear bomb?

b) What is the photoelectric effect and why is it important?

c) Calculate the mass defect and binding energy of ${}_{11}Na^{23}$. Mass of each neutron =1.008665 a.m.u. , Mass of each proton= 1.007277 a.m.u., Mass of sodium nucleus=7.016005 a.m.u..

3. a)What is the key difference and the key similarity between beta (β−) decay and alpha decay?

b) What is the function of a moderator in a nuclear reactor?

c) A 530nm violet light is incident on a calcium photoelectrode with a work function of 2.81 eV. Find the energy of the incident photons and the maximum kinetic energy of ejected electrons.

4. a) Explain why the photoelectric effect cannot be explained by classical physics

b) Define and make clear distinctions between the terms neutron, nucleon, nucleus, and nuclide.

c) A piece of radium becomes one-eighth part on radiating radioactive radiation for 6700 years.Find the decay constant of radium.

5. a) Why do we use DC instead of AC?

b) What is the relationship between frequency and angular frequency?

c)An alternating current is expressed as $i=18\sin \pi t$.Calculate frequency, peak value,and root mean square value of the current.

6. a) Discuss any similarities and differences between the photoelectric and the Compton effects.

b)Distinguish between resistance, reactance and impedence?

c)The work function of sodium is 4.3eV.Calculate the maximum kinetic energy when light wavelength of 2300 A is incident on it.