

Daffodil International University

Faculty of Science & Information Technology Department of Computer Science & Engineering Final Semester Examination, Fall 2024 Course Code: PHY102, Course Title: Physics II Level: 1 Term: 2 Batch: 66

Time: 2:00 Hrs.

Marks: 40

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

¥.	e)	Define nuclear binding energy.	1	COL
	<i>b</i>)	Identify what occurs during alpha decay in a radioactive atom.	1	
1	(A)	Distinguish between nuclear fission and fusion reactions.	2	
	TI)	Describe Heisenberg's uncertainty principle.	2	-
	(à)	Outline the Compton effect with a proper diagram.	2	
	A	Write down the postulates of the theory of relativity.	- 2	
2.	0	Demonstrate why an electron cannot exist within the nucleus.	3	
	Ø	Explain the significant observations from various atomic models that illustrate the structure of the atom.	4	- CO2
	of	State Lorentz transformation and calculate time dilation using Lorentz transformation.	4	
	Ø	From radioactive decay law show that $N = N_o e^{-\lambda t}$, where the symbols have their usual meanings.	4	
8.	a)	Find the mass defect, binding energy and binding energy per nucleon of $^{62}_{28}Ni$ nucleus. Given that, atomic mass of hydrogen = 1.007825u. Mass of a neutron = 1.008665u and atomic mass of nickel = 61.928348u.	3	CO3
	6)	Calculate the maximum kinetic energy of the electron emitted from a metal surface when light of wavelength 2400Å incident on it. The work function of netal surface is 2.3eV.	3	
	4	An astronaut, at the age of 30 years, went to investigate the Milky Way by a spaceship moving with a speed of $2.4 \times 10^8 \text{ ms}^{-1}$ and returned after 50 years (according to the calendar of the earth). What will be his age	3	
	(d)	The half-life of a radioactive material is 15 hours. If the initial mass of that material is 4g then after 60 hours how much of that material will remain unchanged?	3	
/	et .	Determine the de Broglie wavelength of an electron moving with a velocity of $v = 1.8 \times 10^7$ m/s.	3	