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Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science and Engineering
Final Examination, Spring-2024
Course Code: PHY102 Course Title: Physics II
Level: 1 Term: 2 Batch: 65

Time: 02:00 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.]

1.	*a)*	Illustrate inertial frame of reference.	1	CO1
	b)	Can you define nucleon?	1	
	c)	Recall Work function and threshold frequency.	2	
	d)	Tell something about Compton effect.	2	
	e)	What can you say about photon?	2	
	f)	List two types of nuclear reactions with example.	2	
2.	*a)*	How did Bohr modify Rutherford Model?	3	CO2
	b)	State Lorentz transformation and calculate time dilation using Lorentz transformation.	4	
	c)	Discover Einstein's mass-energy relation from Newton's 2nd law of motion.	4	
	d)	Show that the half life of a radioactive element is inversely proportional to the decay constant of that element.	4	
3.	*a)*	The electron in a hydrogen atom is rotating in the third orbit. Compute its angular momentum. ($h=6.6 \times 10^{-34}$ Js)	2	CO3
	b)	A and B are radioactive elements. Half life of them are 6 days and 9 days respectively. Which element will take more time to decay 60% of their initial amount?	3	
	c)	Find (i) the mass defect, (ii) the binding energy and (iii) the binding energy per nucleon for a helium ($_2He^4$) nucleus. Express mass defect in amu unit and binding energy in MeV, eV and Joule units. [Mass of Helium = 4.00276 amu, mass of a proton = 1.00728 amu, mass of a neutron = 1.00876 amu and 1 amu = 931 MeV].	3	
	d)	If ray of green color of wavelength of 5400Å is incident on sodium metal will there be photoelectrons generated? The work function of metal sodium is 2.3 eV.	3	
	e)	An object of 100kg is there in a train which is moving in relative motion. The length of the train is 50% of its rest position when in motion. i) Find out the velocity of the train. ii) What will be the change of mass of the object when the train will be stopped?	4	