

AP PHYSICS ASSIGNMENT SHEET: UNIT 13 - NUCLEAR PHYSICS

MR. DARLINGTON

Topic (Percent of AP Exam)	Reading HW	HW Problems	
VI. ATOMIC AND NUCLEAR PHYSICS (10%) [C5]			
27. EARLY QUANTUM THEORY AND MODELS OF THE ATOM [C5]			Chapter 27
27.1 Discovery and properties of the Electron	27.1	page 782 skip these on p 782	1 WEEK
27.2 Planck's Quantum Hypothesis	27.2	4	
*Thomson and Millikan's experiments related to the electron are described		2	
*The basics of Planck's hypothesis are discussed		3	
27.3 Photon Theory of Light and the Photoelectric Effect	27.3	page 783	
*Photons are defined		18 ans: 401 nm	
*The photoelectric effect is described		19	
*The work function of a metal is defined		20 to part a only, ans: 2.18 eV	
*Einstein's explanation of the photoelectric effect is presented		21	
27.4 Photon Interactions: Compton Effect and Pair Production	27.4	22 ans: a) 0.92 eV, b) 5.7 E 5 m/s	
*Pair production is defined and described		23	
*The Compton effect is described		page 784	
27.6 Wave Nature of Matter	27.6	44 calculate wavelength only, v electron is 1.04 E 8 m/s, ans: 7 E -12 m	
*The equation for the de Broglie wavelength of a particle is stated		48 calculate photon energy and state values	
27.9 Atomic Spectra: Key to the Structure of the Atom	27.9	answers for 48: a) 12.1 eV, b) 3.0 eV, c) 0.31 eV	
*Review of atomic spectra			
30. NUCLEAR PHYSICS AND RADIOACTIVITY [C5]			Chapter 30
30.1 Structure and Properties of the Nucleus	30.1	page 860	1 WEEK
*Review of the structure and properties of the nucleus		12 use N-14 = 14.003074 amu, ans: 7.5 eV/nucleon	
30.2 Binding Energy and Nuclear Forces	30.2	15 masses: Na-23: 22.989770, Na-24: 23.990963	
*The total binding energy of the nucleus is defined		22 support ans w/#s. ans: mass increased, none work.	
*The strong and weak nuclear forces are discussed		27 for part (b), use $E = mc^2$ and binding energy of daughter formed	
30.3 Radioactivity	30.3		
*The history of radioactivity is discussed			
*The types of radiation emitted in radioactivity are enumerated			
30.7 Conservation of Nucleon Number and other Conservation Laws	30.7		
*The law of conservation of nucleon number is stated			
31. NUCLEAR ENERGY; EFFECTS AND USES OF RADIATION [C5]			Chapter 31
31.1 Nuclear Reactions and the Transmutation of Elements	31.1	page 886	1 WEEK
*Transmutation is defined		16 126.5 MeV	
*Nuclear reaction is defined		22 200 MeV released per atom split, ans: 3.7 g	
*Threshold energy is defined		27	
31.2 Nuclear Fission; Nuclear Reactors	31.2		
*Nuclear fission is defined			
*A chain reaction is described			
*A nuclear reactor is described			
*Critical mass is defined			
*Research reactors, power reactors and breeder reactors are described			
*Risks associated with nuclear power plants are discussed			
*The history of the development of the atomic bomb is presented			

ATOMIC, NUCLEAR PHYSICS, RADIOACTIVITY, NUCLEAR ENERGY AND EFFECTS EXAM AND PROBLEM SET DUE DATE: TUESDAY, APRIL 29