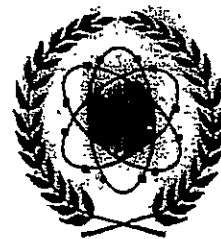




Physics Department, Faculty of Science,
Menoufia University
Final Term Exam. First term, 2019
Course: Atomic II (P237) Time : 2 hrs.



Answer The Following Questions

1		(70)
A-	Describe the Zeeman phenomenon and its experimental arrangement, and according to the quantum mechanical explanation derive the expression of Zeeman- shift.	
B-	Calculate the wavelength separation between the two unmodified lines of wavelength 6400 \AA , when the magnetic field induction of 1.4 Wb m^{-2} is applied in normal Zeeman effect. (the specific charge $1.76 \times 10^{11} \text{ C/Kg}$)	
C-	Explain the Frank –Hertz experiment.	
2		(70)
A-	Explain the magnetic dipole moment due to orbital motion and define the gyromagnetic ratio.	
B-	State the Bohr postulates, and derive the value of radius and energy of the electron orbit	
C-	Draw the energy level diagram of an atom with one valance electron , and show the electron configuration of the atom.	
3-		(10)
1.	--- <u>Choose the correct answer:</u> The Larmor precession produces a: A Change angular velocity and the form of orbit B Change angular velocity without any change in form of orbit C Change form of orbit and field direction	
2.	--- When a magnetic dipole moment μ_l is placed in an external magnetic field it experiences an : A Excess energy B Torque C Excess momentum	
3.	--- In inelastic collision between two atoms there an : A Gain energy B Transfer of energy C Lose some energy	

4.	<p>--- A B C</p>	<p>The hyper fine structure of the atomic line is mainly due to: Excitation of atom Isotope effect and nuclear spin Nuclear and electron spin</p>
5.	<p>--- A B C</p>	<p>The excitation of atom due to raise of temperature is called: Collisional excitation Thermal excitation Molecular excitation</p>
6.	<p>--- A B C</p>	<p>Excitation energy is energy required to excite free electron from given orbit to higher state Ground state to higher state Ground state to outside</p>
4-	<p>1- 2- 3- 4- 5- 6- 7- 8-</p>	<p><u>Complete :</u> (30) Stern and Gerlach experiment use an , Field to prove the of electron The Lorentz unit ($ehB/4\pi m$) is the unit of used for expressing the of energy levels in a magnetic field. In vector atom model the two distinct features are : 1) 2)..... The maximum number of electrons in subshell with a given orbital quantum number L is equal In case of anomalous Zeeman effect the applied field is , and in case of Stark effect the applied strong external field is compared to the interatomic field. Critical potential is potential required to excite a free electron from state to a state ,but ionization potential is required to electron from given orbit to..... The principle quantum number n determines the of electron, while the orbital quantum number L determines theof angular momentum. The electron configuration of Al- atom is and the multiplicity is equal</p>