



AL-Qadisiya University
College of Engineering
CHEMICAL ENGINEERING DEPT.
Examination 2015-2016
Examiner : Professor Dr. Raad Sh. ALnayli

Subject: Physical Chemistry
Class: 2nd year
Time : 3 hour
Max. Marks: 40
Date: 29/5/2016

Answer four Questions only, 10 Marks for any question

Q1:- For a reversible cell, prove that the Gibbs energy of reaction,

$\Delta_r G$, is proportional to the cell potential as the following expression:-

$$\Delta_r G = -nFE$$

where n is the number of electrons transferred and F is Faraday's constant.

Q2:- Estimate the linear frequencies of the light which is required to extract e^- from He, Li and H atoms

Q3:- What are the mathematical formulas for the following:-

1- De Broglie's Hypothesis 2- Heisenberg uncertainty principle,

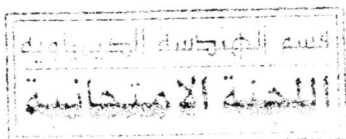
3- Boltzmann distribution of the population between the UPPER levels & N_{LOWER} for equilibrium atom system.

Q4:- .What are the ASSUMPTIONS for the Compton effect and with the sketch give the equations to calculate the energy, momentum and the velocity of the photon & the electron before and after the collision.

Q5:- Prove that the ratio R between the spontaneous and stimulated emissions can be expressed by :-

$$R = \exp(h\omega / 2\pi k T) - 1$$

,where ω is the angular frequency & h, k are Planck and Boltzmann constant.



GOOD LUCK

