



University of Technology  
Department of Applied Sciences  
Final examination 2015/2016

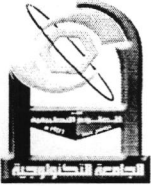
Subject : modern physics  
Branch : Applied physics  
Examiner :Dr. Esam A. Tawfiq

Class: second level  
Time : 3 hours  
Date :

**NOT: ANSWER FOUR QUESTIONS ONLY**

- 1- A photon of 1MeV collides with a free but stationary electron and scattered of at  $90^\circ$ . what are the energies of the scattered photon and the kinetic energy of the recoiling electron?
- 2- The photoelectric work function of potassium is 2.3 eV. Light having a wavelength of 260 nm falls on potassium. (a) Find the stopping potential for light of this wavelength. (b) Find the kinetic energy of the most energetic electrons ejected. (c) Find the speeds of these electrons.
- 3- A sample of hydrogen atoms is irradiated with light with a wavelength of 85.4 nm, and electrons are observed leaving the gas. (a) If each hydrogen atom were initially in its ground level, what would be the maximum kinetic energy in electron volts of these photoelectrons? Not the ground state energy is  $-13.60$  eV.
- 4- The electrons in Davisson-Germer experiment had a kinetic energy of 54 eV.  
(A) Calculate the DeBroglie wavelength of these electrons.  
(B) What would be the DeBroglie wavelength of protons of the same kinetic energy of 54 eV ?  
 $1.6 * 10^{-27} \text{ kg}$
- 5- An electron is in a box 0.1nm across, which is the order of magnitude of atomic dimensions. Find its minimum energy of the electron.

GOOD LUCK



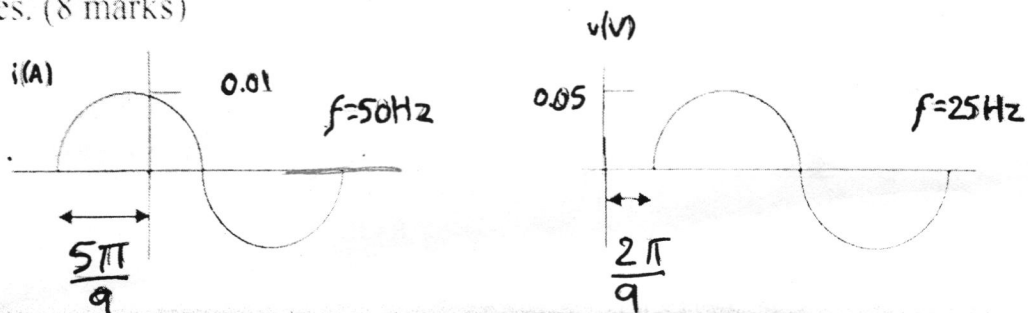
Subject : Electrical circuits  
Branch : Applied physics  
Examiner: Dr. Wafaa Abdul khaliq

Class : 2nd year  
Time : 3 hours  
Date :

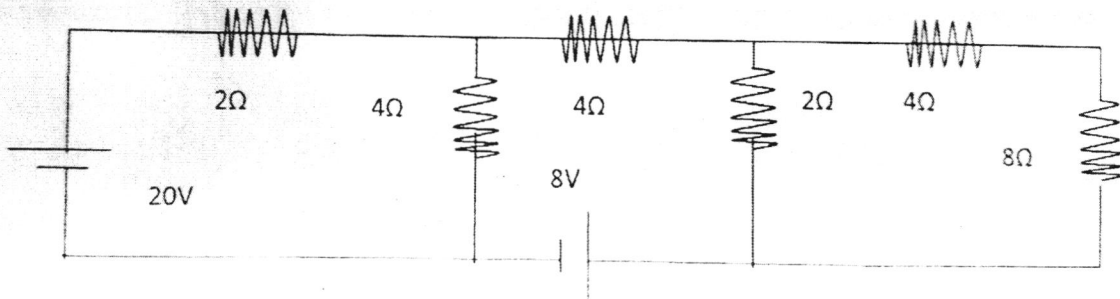
Answer four questions only

Q-1-A- Calculate the current through resistance of 33 m of copper wire if the diameter is 0.3mm and the voltage drop across it is 16V and  $(\rho = 1.724 \times 10^{-9} \Omega\text{-cm})$ .

Q.1-B- Write the expression for the waveforms with the phase angle in degrees. (8 marks)



Q-2- Find the current in 8 Ω resistor using Thevenin theorem.



Q-3-Using a Δ-Y or Y-Δ conversion, find the current I.

