



**University of Technology**  
**Department of Applied Sciences**  
**Final Examination 2015/2016 2<sup>nd</sup> Attempt**



**Subject: Electricity & Magnetism**  
**Branch: Laser & Optoelectronics**  
**Examiner: Dr. Khaleel Ibrahim**

**Class: 1st year**  
**Time: 3 hours**  
**Date: 04/ 09/2016**

*Answer FIVE Questions*

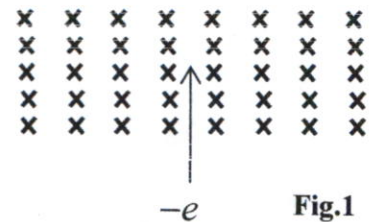
**Q1 (A) Define SIX of the following terms (a) Gauss Law , (b) Electric Potential (c) Biot-Savart Law (d) Displacement current (e) Magnetic permeability (f) Bohr Magneton (g) Magnetic Torque (6 Marks)**

**(B) (a) Carry out the following arithmetic operations: (i) the product  $0.089 \times 541.3$ ; (ii) the product  $7.520 \times \pi$  (2 Marks)**

**(b) How many significant figures مؤثرة are in the following numbers? (i)  $67.92 \pm 0.2$  (ii)  $0.0193$ . (2 Marks)**

**Q2 (A) What is the electric flux through a sphere that has a radius of 1.00 m and carries a charge  $+1.00 \mu\text{C}$  at its center? (7 Marks)**

**(B) An electron moves in the plane of this paper toward the top of the page. A magnetic field is perpendicular to the plane of the page and directed toward the page. The direction of the magnetic force on the electron is (a) toward the top of the page, (b) toward the bottom of the page, (c) toward the left edge of the page, (d) toward the right edge of the page, (e) downward into the page, (f) upward out of the page.**

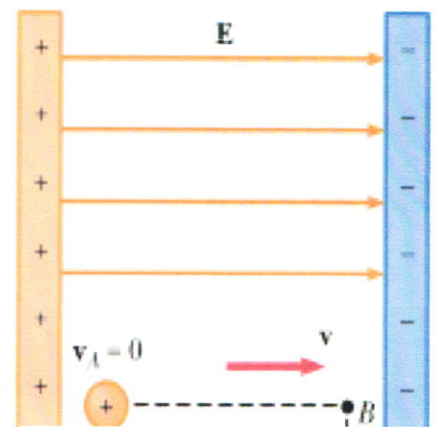


**Fig.1**

**(3 Marks)**

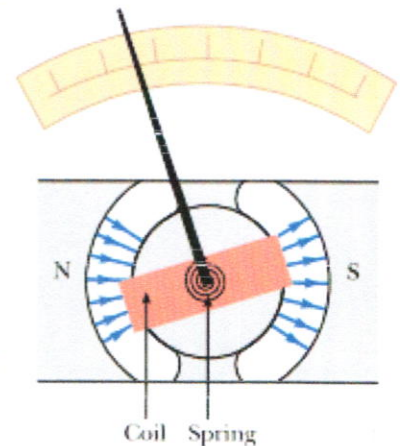
**Q3 (A) Explain what ماذا causes المغناطيسية magnetism in materials. (5 Marks)**

**(B) A proton is released from rest in a uniform electric field that has a magnitude of  $8.0 \times 10^4 \text{ V/m}$  (Fig. 2). The proton undergoes يعاني a displacement of 0.50 m in the direction of  $\vec{E}$ . Calculate the velocity at B. (5 Marks)**



**Fig.2**

**Q4 (A) An end view of a D'Arsonval galvanometer is shown in Figure 3. When the turns لفات of wire making up the coil carry a current , the magnetic field المجال المغناطيسي created by المتكون بواسطة the magnet المغناطيس exerts يسلط on the coil الملف على a torque عزمًا that turns it يدوره (along with its attached pointer) against مضاد the spring للسيرنك. Show اثبت that the angle of deflection زاوية الانحراف of the pointer المؤشر is directly proportional متناسب طردياً to the current in the coil. (5 Marks)**



**Fig. 3**

