THE INTERNATIONAL UNIVERSITY (IU) – VIETNAM NATIONAL UNIVERSITY - HCMC

FINAL EXAMINATION – CLASS

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Date: June 2014

Duration: 120 minutes

SUBJECT: PHYSICS 3	
Chair of Department of Physics: Signature: Full name: Phan Bao Ngoc	Lecturer: Signature: Full name: Phan Bao Ngoc

INSTRUCTIONS: This is a closed book examination. Use of cell phones, laptops, dictionaries is not allowed.

1/ (15 pts) The parallel plates as shown in Figure 1 are 3.6 cm apart. A 0.070-T magnetic field is present in the space between the plates perpendicular to the plane of the paper. When an electron travelling horizontally with a speed of 5.0×10^5 m/s enters the region, it passes through un-deflected. What is the potential difference between the plates?

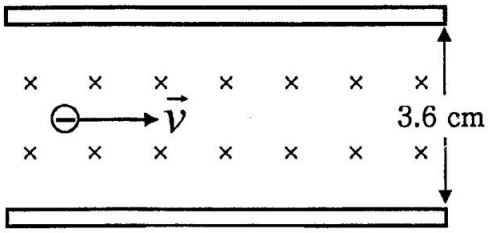

Figure 1

2/ (15 pts) A 250-turn square loop, having a side length of 10 cm, carries a current of 7 A. The loop is placed in an external magnetic field of magnitude 2.0 T. Determine the magnitude of the maximum torque exerted on the loop.

3/ (15 pts) In Figure 2, two long parallel straight wires, at a separation d = 70.0 cm, carry currents i_1 = 3.0 mA and i_2 = 4.0 mA, out of the page. At what distance from the origin on the x axis is the net magnetic field due to the currents equal zero?

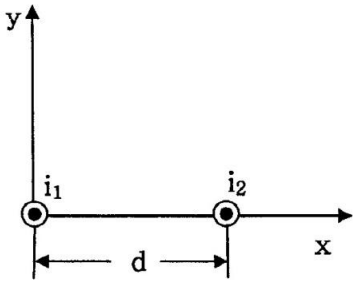

Figure 2

4/ (15 pts) A 5-turn square coil (10 cm along a side) with a resistance of 4.0 Ω is placed in a magnetic field that makes an angle of 30^0 with the plane of the coil. The magnitude of this field with time according to $B = 0.50t^2 + 0.2t$, where t is measured in s and B in Tesla. What is the induced current in the coil at t = 2.8 s?

5/ (20 pts) Two inductors L_1 and L_2 are connected in parallel and separated by a large distance.

(a) Show that the equivalent inductance is given by:

$$\frac{1}{L_{eq}} = \frac{1}{L_1} + \frac{1}{L_2}$$

(b) Why must their separation be large for this relationship to hold?

(c) What is the generalization of (a) for N inductors in parallel?

6/ (20 pts) Determine the voltage dropped between points A and B in the circuit as shown in Figure 3.

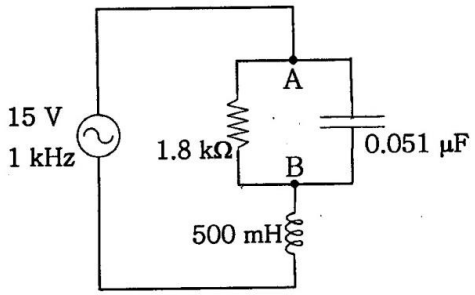

Figure 3

END OF QUESTION PAPER