COLLEGE OF ENGINEERING & TECHNOLOGY

Department : Electrical & computer Control Engineering
Lecturer : Prof. Dr. Medhat El Singaby
Course : Electrical measurements & instrumentations (1)
Course Code : EE 211 **Marks:** 40
Date : 28/5/2015 **Time** : 2 hours

Final Exam

Answer the following questions:

Question no.1 A-1

a) Calculate the absolute and percentage errors in μ if

$$\mu = \pi r^2 (p_1 - p_2) / (8QL)$$

Given that: r = (0.5± 0.01) mm , p_1 = (200 ± 3) k pa, p_2 = (150 ± 2) k pa
Q = 4 * 10^{-7} m^3/s and L = 1 m

b) the resistance of a moving coil voltmeter is 12000 Ohms,
The moving coil has 100 Turns and is 4 cm long and a 3 cm wide. The flux density in the air gap is 6 * 10^{-3} T.
Find the deflection produced by 300 V in radians if the spring control gives a deflection of 1 degree for a torque of 25* 10^{-7} N.M.

(10 marks)

Question no.2 B-2

a) For a moving iron instrument with a spring control, Prove that

$$C\,\Theta = 0.5\, I^2\, dL/d\Theta$$

b) The Law of deflection of a moving iron ammeter is given by $I = 4\Theta^n$, where Θ is the deflection in radians and n is a constant. The self inductance at zero deflection is 10 mH , and the controlling constant is 0.16 Nm / rad.

(i) Find an expression for self inductance of the meter as a function of Θ and n .
(ii) Calculate the meter current by n = 0.75 , and the deflection corresponding to self inductance 60 mH.

(10 marks)

Members of Course Examination Committee:	Signature:	Date:
Lecturer: Prof. Medhat El Singaby		11/5/2015
Course Coordinator: Dr. Ahmed El Shenawy		11/5/2015
Head of Department:Prof. Hamdy Ashour		11/5/2015