



COLLEGE OF ENGINEERING & TECHNOLOGY

Department : Electrical & Computer Control Engineering

Lecturer : Dr. M. Abdel-Rahim

Course : Electrical Measurements and Instrumentations (1)

Course Code : EE 211

Marks : 40

Date : 13 / 1 / 2016

Time : 2 hour

Final Exam

Answer the following questions :-

1- (a) The resonance frequency in the parallel circuit is given as

$$f_0 = \frac{1}{2\pi} \sqrt{\frac{1}{LC} - \frac{R^2}{L^2}}$$

Given that $R = (10 \pm 0.01) \Omega$, $L = (1 \pm 0.02) \text{ H}$, $C = (100 \pm 0.02) \mu\text{F}$
Calculate the absolute and percentage error in this frequency.

(b) The following readings are taken of a certain physical length. Compute the mean reading, standard deviation, random error, and the exact value.

Reading	1	2	3	4	5	6	7	8	9	10
x_i (cm)	5.30	5.73	5.73	5.26	4.33	5.45	6.09	5.64	5.81	5.75

(10 marks) (B2)

2- (a) Using a neat drawing compare between spring torque and gravity control in an indicating instrument.

(b) Sketch and explain the operation of moving-coil instrument.

(c) A moving-coil instrument has the following data: number of turns = 100, width of coil = 20 mm, depth of coil = 30 mm, flux density in the gap = 0.1 Wb/m^2 . Calculate the deflecting torque when carrying a current of 10 mA. Also calculate the deflection if the control spring constant is $2 \times 10^{-6} \text{ N-m/degree}$.

(10 marks) (C1)

3- (a) Derive the torque equation of moving iron instrument and comment on the shape of the scale.

Members of course Examination Committee:	Signature:	Date:
Lecturer: Dr. M. Abdel-Rahim	M. Abdel-Rahim	4/1/2016
Course Coordinator: Ahmed El-Sherbini	Ahmed El-Sherbini	4/1/2016
Head of Department: Prof. Hamedy Ashour	Hamedy Ashour	4/1/2016