26 (9/0/2) 2

Menofiya University Faculty of Engineering Dept of Electrical Engineering . Date: 1 /1/2014 Total Marks: 120



Final Term Exam Academic Year: 2013-2014 2<sup>nd</sup> Year Allowed Time: 3 Hours

Subject/Code: Measurements & Measuring instruments / ELE212 This exam measures ILO's no. (A3, B1, C1, C3, C4) Remarks: No. of pages: 2 No. of questions: 6 Allowed Tables and Charts: (None)

# Answer All The Following Questions:

#### The First Question (20- Marks)

Compare construction, deflection torque, damping type, scale shape and application for : moving coil instrument, moving iron instrument and electrodynamics instrument

## The Second Question (20- Marks)

Give a short account of the following items:

- a) Swamping resistance
- b) VAR meter
- c) Power factor meter
- d) Type of wattmeter connections and its effect on the wattmeter reading

### The Third Question (20- Marks)

a) The inductance of moving iron instrument is given by

 $L = 8 + 3.05\theta - 0.007\theta^2 mH$ 

Where  $\Theta$  is the deflection in degree. The spring constant is  $5x^{10^{-7}}$  Nm/ deg. Find the current that will produce a deflection of 30° and 70°.

b) What is the effect of presence of inductance in the voltage coil of a wattmeter upon the reading?

### The Fourth Question (20- Marks)

a) Draw and explain the major components of a CRT.

b) Referring to the pattern in Figure (1). Given that the vertical frequency is 100 Hz, determine the horizontal frequency.

#### The Fifth Question (20- Marks)

- a) Explain the main performance parameters of (DVMs).
- b) Find the successive approximation A/D output for a 8-bit converter to a 7.65 volt input voltage if the reference voltage is 10 volts.

#### The Sixth Question (20- Marks)

- a) What is the difference between Sensor and Transducer
- b) Explain the difference between RTD and thermocouple techniques.
- c) A resistant strain gauge with a gauge factor of 2 is fastened to a steel member, which is subjected to strain of  $1 \times 10^{-6}$ . If the original resistance value of the gauge is  $130\Omega$ , calculate the change in resistance.
- d) An ac LVDT has the following data: input 6.3V, output ± 5.2V, range ±0.50 inch.
  Determine:
- 1- The plot of the output voltage versus core position for a core movement going from +0.45 inch to -0.03 inch.
- 2- The output voltage when the core is -0.25 inch from center.

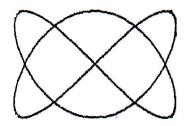


Figure (1)

With best wishes