UNIVERSITY OF ENERGY AND NATURAL RESOURCE
SCHOOL OF ENGINEERING
ELECTRICAL & ELECTRONIC ENGINEERING

ELNG 202 ELECTRICAL MEASUREMENTS & INSTRUMENTATION

Second Mid-Semester Exams *March 2016*

Attempt ALL Questions. TIME: 1hr

Q1. The inductance of a moving-iron ammeter with a full scale deflection of 90^0 at 1.5A is given by $L = (200 + 40\theta - 4\theta^2 - \theta^3)\ \mu H$ where θ is the deflection in radian from zero position. Estimate the angular deflection of the pointer for a current of 1A **[5marks]**

Q2. A moving-coil ammeter has a fixed shunt of 0.02Ω. With a coil resistance of R = 1000Ω and a potential difference of 500mV across it. Full scale deflection is obtained.

(a) To what shunted current does it correspond
(b) Calculate the value of R to give full scale deflection when shunted current I is (i) 10 A (ii) 75A **[10 marks]**

Q3. The angle of deflection in radians from the zero position of Moving-Iron Instruments is given as below; **[10 marks]**

$$\theta = {}^1/_2 \frac{I^2}{K_c}\frac{dL}{d\theta}$$

Derive this expression.

Hint: (-Electrical energy supplied = change in stored energy + Mechanical work done,

-At steady state equation Control Torque (Tc) = deflection Torque (Td) **)**

Q4. Determine the values of Rx and Lx of the bridge circuit at balanced condition shown below **[10 marks]**