ELIZADE UNIVERSITY, ILARA- MOKIN. ONDO- STATE

FIRST SEMESTER EXAMINATION, 2016/2017 SESSION

PHY 409 – ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

TIME: 2 HOURS 30 MINUTES.

ANSWER THREE OUT OF FOUR QUESTIONS

HOD'S SIGNATURE

Question one

(I)   Describe the following errors with respect to experimental results (a) erratic errors (b) systematic errors (c) random errors.

(II)   The guaranteed accuracy of a flow meter working on thermal principles is $\pm5\%$ of full scale reading of $3.2 \times 10^{-6} m^3/s$. If the flow measured by this meter is $1.35 \times 10^{-6} m^3/s$. Calculate the limiting error in percentage. Comment upon the results.

Question two

(i)   The unknown resistance in a Wheatstone bridge is measured by using three known resistances such that $R = R_2 R_3 / R_1$, where $R_1 = 62 \pm 0.5\%\ \Omega$, $R_2 = 250 \pm 0.5\%\ \Omega$, $R_3 = 220 \pm 0.5\%\ \Omega$

(ii)   How are **known errors** treated?

(iii) During a test the current was measured as 36.5A flowing in a resistor of 0.12Ω. Later on it was discovered that the ammeter reading was low by 1.1% and the marked resistance was high by 0.25%. Calculate the true power as a percentage of the power that was originally calculated.

Question three

(i)   With the help of a neat diagram, explain the construction and principle of operation of Q- meter.

(ii)   Calculate the value of distributed capacitance of a coil when the following measurements are made: at frequency $f_1 = 2MHz$, the tuning capacitor is set at 410pf, at frequency $f_2 = 5MHz$, the tuning capacitor is tuned at 50pf.

Question four

(i)   What is an integrated circuit?

(ii)   List three each, the advantages and disadvantages of integrated circuit.