Nepal College of Information Technology

**Unit Test**

Spring 2012

Program : BE Time : 2 hrs

Semester : (II) FM : 70

Subject : Instrumentation PM : 35

* *Candidates are requested to give their answer as far as practicable in their own words.*
* *The figure in the margin indicates the full marks*
* *Assume suitable data if necessary*
* ***Attempt ALL question***

1. a) With the help of block diagram explain the various components of a generalized instrumentation system [8]

b) The following ten observation were recorded when measuring a voltage : 41.7, 42.0, 41.8, 42.0, 42.1, 41.9, 42.0, 41.9, 42.5, 41.8 volt. [7]

Find i) (Mean) (ii) Standard Deviation (iii) probable error (iv) Average Deviation.

2. a) Define performance parameter. What are its type? Describe the dynamic performance parameters of an instrument [8]

b) A Resistor is measured by the voltmeter – ammeter method. The voltmeter reading is 123.4v on the 250v scale and ammeter reading is 283.5 mA on the 500mA scale. Both the meters are guaranteed to be accurate within ±1% of the full scale Calculate: [7]

(i) Measured value of resistance

(ii) The limits within which you can guarantee the result ( in percentage).

3. a) What do you mean by loading effect? Explain loading effect in terms of shunt connected instruments. [8]

b) A moving coil milli - voltmeter has a resistance of 20 Ω and a full scale deflection of 1200 is reached when a potential difference of 100mv is applied across its terminals. The moving coil has the effective dimensions of 3.1cmx2.6cm and is wound with 120 turns .The flux density in the gap is 0.1ST, Determine the control constant of the spring and suitable diameter of copper wire for coil winding if 55% of the total instrument resistance is due to coil winding. resistivity (for) Cu=1.73x10-6Ωcm [7]

4. a) How would you measure the value of unknown inductance using bridge ckt? Derive necessary expression. [8]

b) The ac bridge is in balance condition with the following constants : arm AB : R =150Ω, arm bc : R =300Ω in series with c =0.265uf , arm cd :unknown and arm DA: R =200Ω in series with L =15.9mh. The oscillator frequence is 1k .Find the constants of arm CD. [7]

5. Write short notes on: (any two) 2 x 5 = 10

a) Errors in instrumentation

b) Types of Signals

c) PMMC meter