Code No: D6403 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech II - Semester Examinations, March/April 2011
INSTRUMENTATION
(POWER ENGINEERING AND ENERGY SYSTEMS)

Time: 3hours **Max. Marks: 60**

Answer any five questions
All questions carry equal marks

\- - -

1. a) Define the terms:
   i) Accuracy ii) Precision iii) Sensitivity
   iv) Resolution v) Lag vi) Repeatability vii) Reproducibility
   viii) Limiting error, giving examples and bringing out the differences between them.
   b) A voltmeter having a sensitivity of $15k\Omega/v$ reads 100V in its 300V scale when connected across an un known resistor when the current through the resistor is 2.0 mA. Calculate the percentage error due to loading effect. [12]

2. a) With the help of a neat sketch explain the principle and working of Bourdon Tube. What are its applications?
   b) Draw the sketch and explain the principle and working of Ionisation gauge. [12]

3. a) Derive the expression for $\frac{eo}{e_{ex}}$ in the case of potentiometer transducers. What is the maximum % error that can occur due to non-linearity in these transducers? Deduce the relatives.
   b) A potentiometric transducer is being used in conjunction with a recorder of $15k\Omega$ input resistance. Non- Linearity is to be controlled to within 1.2% Potentiometers of 10W rating with values form 100Ω to $10k\Omega$ are available in steps of 100Ω. Determine the value of potentiometer which gives the greatest sensitivity. [12]

4. a) Explain about the materials used for filament wires, base carrier materials, strain gauges cements used in the construction of strain gauges.
   b) Describe the relation ship between gauge factor and Piossson'sgation of a strain gauge material. [12]

5. a) What is magneto strictive effect? Describe the principle and operation of magneto strictive transducer.
   b) Draw the circuit schematic and explain the principle of operation of photo pulses pick up transducer. [12]

6. a) With the help of necessary graphs, explain the principle and working of Dual Slope Integrating type ADC.
   b) Draw the schematic and explain the principle of weighted Resistor Network type DAC. [12]

7. a) Draw the graphs and explain the principle and working of Dual Slope ramp type DVM.
   b) What is the principle of Laser Doppler Anemometer? Explain its working. [12]

8. Write notes on any **Two**
   a) Computer Aided Measurements b) IEEE 488 Electrical Interface
   c) Smart Transmitters [12]

****