

**B.Tech. - VIEP - ELECTRICAL ENGINEERING  
(BTELVI)**

00916

**Term-End Examination**

**June, 2015**

**BIEE-019 : ELECTRICAL INSTRUMENTATION**

*Time : 3 hours*

*Maximum Marks : 70*

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*Note : Attempt any seven questions. All questions carry equal marks. Use of scientific calculator is permitted*

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1. Write short notes on any *four* of the following :  $4 \times 2 \frac{1}{2} = 10$
- (a) R.V.D.T.
  - (b) Active Transducers
  - (c) Rotational Potentiometers
  - (d) Pneumatic Controller
  - (e) Opto Electronic Transducer
2. (a) Write down the advantages and disadvantages of electric transducers. 5
- (b) With the help of a schematic diagram, explain the measurement of pressure into electrical signal using Bourdon Tube and L.V.D.T. 5

3. (a) Explain the working of a Hall Effect transducer. 5
- (b) Write down any five characteristics of a resistance wire strain gauge. 5
4. (a) Write down the advantages of thermistor over thermocouples. 5
- (b) A capacitive transducer uses two quartz diaphragms of area  $750 \text{ mm}^2$  separated by a distance of  $3.5 \text{ mm}$ . A pressure of  $900 \text{ kN/m}^2$  when applied to the top diaphragm produces a deflection of  $0.6 \text{ mm}$ . The capacitance is  $370 \text{ pF}$ , when no pressure is applied to the diaphragms. Find the value of capacitance after the application of a pressure of  $900 \text{ kN/m}^2$ . 5
5. (a) Enumerate the comparative analysis between strip chart and X-Y recorder. 5
- (b) A quartz piezo-electric crystal having a thickness of  $2 \text{ mm}$  and voltage sensitivity of  $0.055 \text{ V}\cdot\text{m/N}$  is subjected to a pressure of  $1.5 \text{ MN/m}^2$ .
- (i) Calculate the voltage output.
- (ii) If the permittivity of the quartz is  $40.6 \times 10^{-12} \text{ F/m}$ , calculate its charge sensitivity. 5

6. (a) Explain general telemetry system with the help of a block diagram. 5
- (b) The tuned circuit in a simple A.M. transmitter uses a  $50 \mu\text{H}$  inductance and  $1 \text{ nF}$  capacitance. If the oscillator output is modulated by radio frequencies up to  $10 \text{ kHz}$ , what is the frequency range occupied by side band? 5
7. Explain the working of spectrum analyzer with the help of a block diagram. 10
8. (a) Discuss the basic components of a digital tape recorder. 5
- (b) Explain the working principle of a magnetic tape recorder. Draw its output voltage vs frequency characteristics for the head and amplifier. 5
9. (a) Discuss the salient features of computer aided measurements. 5
- (b) Differentiate between analog and digital data acquisition system. 5
10. (a) Draw and explain the block diagram of a unity feedback system with integral control. 5
- (b) Express the output of the integral controller as a function of integral time and error. 5