

**B.Tech. – VIEP – ELECTRONICS AND
COMMUNICATION ENGINEERING
(BTECVI)**

00669

Term-End Examination

December, 2014

**BIEL-009 : ELECTRONIC MEASUREMENT AND
INSTRUMENTATION**

Time : 3 hours

Maximum Marks : 70

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

1. With suitable examples distinguish between
 - (a) direct and indirect methods of measurement 4
 - (b) deflection and null methods of measurement 3
 - (c) analogue and digital methods of measurement 3

2. (a) Explain the terms : 5
 - (i) Resolution
 - (ii) Linearity
 - (iii) Hysteresis
 - (iv) Drift

- (b) What do you mean by 'static calibration' ?
Give the steps which are necessary in performing a calibration. 5

3. (a) Discuss the various types of systematic errors encountered in electrical measurements, with examples. 5
- (b) A voltmeter having a sensitivity of $1 \text{ k}\Omega/\text{V}$ is connected across an unknown resistance in series with a milliammeter reading 80 V on 150 V scale. When the milliammeter reads 10 mA , calculate the error due to loading effect of the voltmeter. 5
4. (a) List the advantages of digital measurements over analogue measurements. 5
- (b) Describe the working principle of an integrating type digital voltmeter with suitable diagrams. 5
5. (a) What is a strain gauge ? Define gauge factor. Derive the expression of gauge factor in terms of Poisson's ratio. 5
- (b) Show schematically how the strain in a material can be measured by a strain gauge. 5
6. (a) Distinguish between active transducers and passive transducers. Explain the points to be considered in determining a transducer suitable for a specific measurement. 5
- (b) Describe the principle of operation of any one type of flowmeter. 5

7. (a) Distinguish between
- (i) $3\frac{1}{2}$ digit and 4 digit display $2\frac{1}{2}$
 - (ii) Light scattering and Field effect types of LCDs. $2\frac{1}{2}$
- (b) Explain how the phase difference between two voltages of the same frequency is determined from the trace on a CRO. 5
8. What is x-y recorder ? How is it different from x-t and y-t recorders ? Explain the working of an x-y recorder with a suitable circuit diagram and mention its applications. 10
9. (a) Discuss with the help of a neat circuit diagram the elements of a standard sweep generator. Draw the output waveform. 5
- (b) Explain how broadband sweep frequencies are generated using a sweep generator. 5
10. Write short notes on any *two* of the following : $2\times 5=10$
- (a) Zero order system
 - (b) Storage oscilloscope
 - (c) Gaussian error distribution
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