B.E. / B.Tech (FullTime) DEGREE END SEMESTER EXAMINATIONS, APRIL/MAY 2014

ELECTRONICS AND COMMUNICATION ENGINEERING BRANCH

FIFTH SEMESTER

EC 375 / EC 9306 – Measurements and Instrumentation

(REGULATIONS 2004/ 2008)

Time: 3 Hours   Max. Marks:100

Answer All Questions

PART-A   (10x2=20)

1) What are the various dynamic characteristics of an instrument?

2) Calculate the maximum percentage error in the difference of two measured voltages, when $V_1 = 50V \pm 1\%$ and $V_2 = 40V \pm 2\%$

3) List the merits and demerits of smart/intelligent sensors.

4) Mention the various interfacing elements of transducers.

5) Give the importance of Isolation amplifier.

6) Why we need to use the acoustical filters?

7) Define the term automation in Voltmeter.

8) Give some basic guarding techniques in digital instruments.

9) List out the drawbacks of digital recorders.

10) Define Virtual instrumentation.

PART-B   (5x16=80)

11 (i) Explain about Calibration and standards in measurement.   (8)

(ii) Write short notes on instrumental and environmental errors.   (8)

12 (a) (i) Explain the construction, principle and working of a linear voltage differential transformer (LVDT).   (6)

(ii) An LVDT has an output of 6V rms when the displacement is 0.2×10^{-3} mm. Determine the sensitivity of this instrument in V / mm. A 5 V voltmeter with 50 scale divisions is used to read the output. Two tenths of a division can be estimated with ease. Determine the resolution of the voltmeter. The above arrangement is used in a pressure transducer for measuring the deflection of a diaphragm. The diaphragm is deflected through 0.5×10^{-3} mm by a pressure of 1000 N / m^2. Determine the sensitivity and resolution of this instrument.   (10)

OR

(b) (i) Describe with neat diagram about fibre optic sensors.   (8)

(ii) Explain the working of piezo electric transducers.　　　　　　(8)

13 (a) Explain briefly with neat diagram, the working of the following:

　　　　(i) Kelvin bridge　　　　　　　　　　　　　　　　(8)

　　　　(ii) Data acquisition systems.　　　　　　　　　　　(8)

OR

(b) The arms of an a.c. Maxwell's bridge are adjusted as:

　　Arm AB: Nonreactive resistance of 700Ω

　　Arm CD: Nonreactive resistance of 300Ω

　　Arm AD: Nonreactive resistance of 1200Ω in parallel with capacitor of $0.5\mu F$.

　　If the bridge is balanced under this condition, find the components of the branch BC.

　　　　　　　　　　　　　　　　　　　　　　　　(16)

14. (a) Explain the different techniques used to measure frequency and time intervals in the digital instruments.　　　　　　　　　　　　　　(16)

OR

(b) Describe the working and operational features of Digital Voltmeters.　　(16)

15.(a) Explain in detail about the various cathode ray oscilloscopes and its applications. (16)

OR

(b) Explain in detail about the operation of the following items with neat diagram.

　　(i) X-Y recorder　　　　　　　　　　　　　　　　(8)

　　(ii) Various printers.　　　　　　　　　　　　　　(8)