LIB
21/12/13 FN

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 31370

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Sixth Semester

Electronics and Communication Engineering

EC 2351/EC 61/10144 EC 602 – MEASUREMENTS AND INSTRUMENTATION

(Regulation 2008/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. A set of independent voltage measurements taken by four observers was recorded as 117.02 v, 117.11 v, 117.08 v and 117.03 v . Calculate

   (a) the average voltage

   (b) the range of error.

2. Bring out the differences between moving coil and moving iron meters.

3. What are the advantages of a Storage oscilloscope?

4. Draw the block schematic of a Vector voltmeter.

5. A signal has a fundamental component with a rms value of 5 volt. Second, third and fourth harmonics have rms values of 1,0.5 and 0.3 volts. Find the harmonic distortion.

6. Compute the value of self capacitance of a coil when the following measurements are made : at frequency f1 = 2 MHz, the tuning capacitor is set as 450 pF . When the frequency is increased to 5 MHz, the tuning capacitor is tuned at 60 pF.

7. What is a Virtual Instrumentation?

8. What are data loggers?

9. What are the elements of a digital data acquisition system.

10. Bring out the significance of IEEE-488 bus standard.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Enumerate the main static characteristics of measuring instruments and explain. (8)

(ii) A circuit was tuned for resonance by eight different students and the values of resonant frequency in KHz was recorded as 532, 548, 543, 535, 546, 531, 532, 536. Calculate the Arithmetic mean, Average deviation and Variance . (8)

Or

(b) (i) Explain the construction of a moving coil meter with relevant diagram and obtain the expression for deflection of the coil. (8)

(ii) A capacitance of 200 pF produces resonance with a coil at a frequency of $2/\pi \times 106$ Hz, while harmonic of this frequency resonance is produced by a capacitance of 40 pF. Calculate the self capacitance of the coil, inductance of the coil . (8)

12. (a) (i) Discuss in detail about the construction of a sampling oscilloscope and explain the method of high frequency measurement using a sampling oscilloscope. (10)

(ii) Discuss about the blocks used and functions of digital storage oscilloscope. (6)

Or

(b) (i) What is a Q meter? Explain about its applications and discuss in detail about any one method of measurement using a Q meter. (10)

(ii) Explain the working of a vector voltmeter. (6)

13. (a) (i) Bring out the differences between a pulse and a square wave generator Draw the block diagram of a typical general purpose pulse generator and explain its working. (8)

(ii) A circuit having an effective capacitance of 160 pF is tuned to a frequency of 1.2 MHz. In this circuit the current falls to 70.7 % of its resonant value when the frequency of an emf of constant magnitude injected in series with the circuit deviates from the resonant frequency by 6 KHz. Calculate the Q factor and effective resistance by 6 KHz. (8)

Or

(b) (i) With the help of a block schematic, explain the working of a digital LCR meter. Bring out its salient features and mention its advantages. (8)

(ii) Discuss in detail about the fundamental suppression type distortion analyser for determining the harmonics present in a signal . (8)

14. (a) (i) Discuss in detail about the various blocks used in a digital frequency counter explaining about the functions performed by each block. (6)

(ii) What are the characteristic features of DVMs? Bring out the advantages of DVMs. Discuss about the working of Ramp type DVM. (10)

Or

(b) (i) Discuss in detail about Automation in digital instruments bringing out the salient features and its advantages. (8)

(ii) Bring out the significance of Computer controlled test systems explaining with an application. (8)

15. (a) (i) What is a Data acquisition system? What is its use? Draw the block diagram of a generalized data acquisition system and discuss about the function of each element. (10)

(ii) Write notes on: Interfacing of Transducers and multiplexing. (6)

Or

(b) Write short notes on:

(i) IEEE 488 bus (6)

(ii) Fiber optic measurements for power and system loss (5)

(iii) Optical time domain reflectometer. (5)