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D 250

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2003.

Fourth Semester

Electronics and Communication Engineering

EC 245 — MEASUREMENTS AND INSTRUMENTATION

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the difference between accuracy and precision?

2. List the different types of possible errors in measurements.

3. Define 'rise time' and 'fall time' of a pulse.

4. What is harmonic distortion?

5. What is known as 'window' in FFT spectrum analyzer?

6. Give the classification of digital voltmeters.

7. What is a vector voltmeter?

8. What is known as fluorescence?

9. What are three basic requirements for a computer operated test system?

10. Draw a schematic diagram of a computer–controlled measurement system for testing a radio receiver using an automatic system.

PART B — (5 × 16 = 80 marks)

11. Explain how a signal is transmitted in a microprocessor based measurement. (16)

12. (a) Define and explain the following :

(i) Instrument errors. (6)

(ii) Limiting errors. (5)

(iii) Environmental errors. (5)

Or

(b) Discuss different types of standards of measurement. (16)

13. (a) Explain various applications of the Spectrum Analyzer. (16)

Or

(b) (i) What is the dynamic range of a spectrum analyzer with a third–order intercept point of + 25 dBm and a noise level of –85 dBm? (3)

(ii) What resolution, total frequency display and dynamic range would be available from an input signal that was sampled for 4s at a sampling rate of 20 kHz using a 10–bit conversion? (9)

(iii) What is an instrumentation amplifier? (4)

14. (a) Explain the working principle of a vector voltmeter with the help of a neat block diagram. (16)

Or

(b) Explain the operating principle of a solid–state electronic multimeter with necessary diagram. (16)

15. (a) With a neat block diagram explain the function of a general–purpose oscilloscope. Also define deflection sensitivity of a CRT. (16)

Or

(b) Write brief notes on :

(i) Storage Oscilloscopes. (8)

(ii) Sampling Oscilloscopes. (8)

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