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Question Paper Code : 33375

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

Fourth Semester

Electronics and Communication Engineering

EC 1255/EC 1351 – MEASUREMENTS AND INSTRUMENTATION

(Regulation 2004/2007)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. How are the standards of measurement classified?
2. How are the amplitude and frequency of a sinewave determined using a CRO?
3. Define percentage total harmonic distortion.
4. What are the common types of errors that occur during frequency measurement?
5. Mention the various elements of a digital data acquisition system and each of their significance.
6. What is the difference between static errors and dynamic error?
7. State the purpose of a bolometer bridge.
8. Mention few applications of spectrum analyser.
9. Mention the important advantages of digital measurement techniques over analog techniques.
10. Write the need for transducers in data acquisition.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Derive the bridge balance equation for an ac bridge and discuss the conditions for balance. (10)
(ii) Write explanatory notes on frequency and time standards. (6)
Or
(b) (i) Draw the circuit of a Maxwell's bridge and explain its functioning. (6)
(ii) With a circuit explain the working of a moving coil meter. (10)

12. (a) Draw the block schematic of a cathode ray oscilloscope and explain the function in detail. (16)

Or

- (b) (i) Draw the circuit of a Q meter and explain with appropriate equations how it can be used to measure Q factor. (8)
(ii) Explain how the Q meter may be used to measure unknown capacitance. (8)
13. (a) (i) With a circuit diagram explain the working of a spectrum analyser. (8)
(ii) Explain the theory of operation of a frequency synthesizer. (8)

Or

- (b) With the circuit diagram explain the working of a wave analyser and a sweep generator. (16)
14. (a) (i) Gating periods of 1 ms, 10 ms, 100 ms, 1 s and 10 s are provided on a digital counter-time-frequency meter having a 3 digit display. A gating period of 10 ms is selected to measure an unknown frequency and a reading of 034 is obtained. What is the likely value of frequency? What steps be taken to check the validity of the result and to obtain a more accurate result? (7)
(ii) Design the circuit of an integrating type of digital voltmeter and discuss the possibility of simulating it using a software. (9)

Or

- (b) (i) Explain in detail about the time base error and gating error. Where do they occur and how to overcome these errors? (8)
(ii) Explain how to extend the range of measurement of a frequency meter. (8)
15. (a) (i) With a block schematic explain the functioning of a digital data acquisition system. (9)
(ii) Write notes on interfacing of transducers. (7)

Or

- (b) (i) With a circuit diagram explain how a fiber optic power meter works. (8)
(ii) With a neat diagram explain the operation of an optical time domain reflectometer. (8)