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**S 9121**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2006.

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. Compare threshold and resolution with suitable diagram.
2. What two conditions must be satisfied to make an ac bridge balance?
3. List two differences between an audio generator and function generator.
4. What are the uses of logic analyzers?
5. List out the general characteristics of DVM.
6. To what accuracy can a frequency counter determine an unknown frequency of 450 KHz, using a 1-s time base and a time base accuracy of 0.01%?
7. What are the types of sweeps in oscilloscope?
8. List the controllers normally found on XY recorder.
9. Give any two applications of  $\mu P$  based measurement system.
10. Draw the block diagram of computer interfaced spectrum analyzer.

PART B — (5 × 16 = 80 marks)

11. (a) (i) A temperature probe having a first order response with a time constant of 1 sec is given a step input of 50°C from 0°C. Calculate the temperature indicated 0.6 sec. after the application of step input. Plot the response characteristics at every 0.2 sec interval upto 2 sec. (8)
- (ii) Sketch the circuit diagram of a Maxwell bridge. Derive the equations for the resistive and inductive components of the measured inductor. (8)

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- (b) (i) Explain the principle of operation of any two types of temperature transducers. (8)
- (ii) Describe in detail the different types of dynamic errors in a measurement system. (8)
12. (a) (i) Draw the block diagram of a function generator and explain the method of producing sine waves. (8)
- (ii) Describe the working of a difference frequency distortion analyzers with the help of a block diagram. (8)

Or

- (b) (i) Explain the working of a sweep frequency generators. What are the sweeper errors? (8)
- (ii) A spectrum analyzer a linear amplitude scale. When the output of a 100 MHz VHF signal generator is observed, three spikes are observed : an 8.8 cm spike for the fundamental (100 MHz), a 2.3 cm spike for 2nd harmonic (200 MHz), and a 0.2 cm spike for the 3rd harmonic (300 MHz). If the 100 MHz spike is the odb reference. Calculate the relationship in decibels of the 2nd and 3rd harmonics. (8)
13. (a) (i) Explain the functioning of integrating type DVM. (10)
- (ii) Write short notes on automation in voltmeter. (6)

Or

- (b) (i) Explain the circuit of digital frequency meter. (10)
- (ii) What are the different methods used in high frequency measurement? (6)
14. (a) (i) Explain the operation of a digital storage oscilloscope with neat diagram. (8)
- (ii) In a CRO, anode to cathode voltage is 1,500 V, the parallel deflector plates are 2.5 cm long and spaced 6 mm. The screen is 60 cm from the center of deflecting plates. Find
- (1) beam speed
- (2) deflection sensitivity. Charge on electron is  $1.602 \times 10^{-19} \text{ C}$  and mass of electron is  $9.109 \times 10^{-31}$ . (8)

Or

- (b) Briefly describe a digital printer and discuss its applications. (16)

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15. (a) Draw and explain  $\mu P$  based measurement for Testing radio receivers.  
(16)

Or

- (b) Discuss any one case study in computer controlled instrumentation system.  
(16)

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