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B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

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. Define Transducers. Bring out the advantages of electric transducers.
2. Bring out the differences between DC and AC Bridges
3. How is frequency, amplitude and pulse width changed in a pulse generator?
4. Draw the circuit diagram for frequency modulation using variable voltage capacitor (VVC) diode. State the specific purpose of using VVC diode.
5. State any four advantages of Digital Instruments over Analog Instruments.
6. A frequency counter with an accuracy of $\pm 1 \text{ LSD} \pm (1 \times 10^{-6})$ is employed to measure frequencies 100 Hz, 1 MHz, and 100 MHz. Calculate the percentage measurement error in each case.
7. What is a power scope? Bring out the differences compared with ordinary CRO.
8. What is a self-balancing potentiometer? Where it is used?
9. Name the different instruments required to completely test an Audio amplifier with the help of computer. Show their connection diagram.
10. Define interface functions and device functions.

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PART B — ($5 \times 16 = 80$ marks)

11. (a) (i) Briefly describe about different measurement **methods**. State the sources of error in measurement and their remedial **measures**.
(ii) State the importance of calibration of measuring **instruments**. Define standards and classify them.

Or

- (b) (i) Draw the circuit diagram and phasor diagram for **Schering** bridge. Derive the expression for unknown capacitance.
(ii) With neat schematic explain the working of **electronic** weighing system.
12. (a) (i) Draw the block diagram of a AM/FM Signal **generator** and explain its working.
(ii) Briefly discuss about wave analysers.

Or

- (b) (i) With the help of block diagram explain the **working of** Distortion analyser.
(ii) Explain the functioning of spectrum analyser with **neat diagram**.
13. (a) (i) Ramp type DVM uses a 1 MHz clock generator and a **ramp** voltage that increases from 0 V to 12.5 in a time of 125 **ms**. Determine the number of clock pulses counted into the register **when** $V_i = 0.9$ V and when it is 7.5 V.
(ii) Draw waveforms to show how time period and pulse width is measured on a digital frequency meter. Explain each case.

Or

- (b) (i) Draw the circuit diagram for time interval measurement and discuss its operation.
(ii) What is reciprocal counting? Where it is used?
14. (a) (i) With neat block diagram explain the working of a Digital Storage Oscilloscope.
(ii) Briefly discuss about linear interpolation and sine-wave interpolation.

Or

- (b) (i) Draw a block diagram to show how high-frequency waveform can be sampled to create a low-frequency dot representation of waveform. Bring out the relationship between the signal frequency, the dot waveform frequency and number of samples per cycle in low frequency wave.
- (ii) Briefly discuss the operation of digital recorders and state the relative advantages of digital recorders over analog recorders.
15. (a) (i) With neat block diagram explain the functioning of computer controlled testing of Radio receiver.
- (ii) State the salient features of GPIB Instrument.

Or

- (b) (i) Draw the schematic of IEEE 488 Instrumentation Bus and explain its features.
- (ii) Write a brief note on Instruments used in computer controlled Instrumentation.