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B. Tech 5th Semester Examination

Electronic Measurements & Measuring Instruments (O.S.)

EE-5002

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions selecting one question from each Section A to D and Section E is compulsory.

SECTION - A

1. (a) Describe the operation and performance characteristics of an LVDT. What are the uses of LVDT?

   (b) A piezoelectric pick up has dimensions of 6 mm x 6mm x 1.5 mm and a voltage sensitivity of 0.012 Vm/N. Relative permittivity of the crystal is 1,400 and modulus of elasticity of the crystal is 12×10^{10} N/m^2. Determine (i) the output voltage (ii) charge sensitivity (iii) strain (iv) charge generated and (v) the capacitance of the pick up. The force applied to the pick up is 10 N.

   (c) Explain operation of sample and hold circuit. **(8+6+6)**

2. (a) Explain briefly the following:

   (i) Weighted resistor D/A converter

   (ii) R-2R ladder D/A converter **(10)**

   (b) Explain with suitable examples:

   (i) Primary transducers (ii) Secondary transducers (iii) Active transducers (iv) Passive transducers (v) Analog transducers (vi) Digital transducers (vii) Inverse transducers. **(10)**

SECTION - B

3. (a) Draw the block diagram of an electronic voltmeter and explain its working.

   (b) Explain various digital display methods. **(10+10=20)**

4. (a) Explain the principle of operation of VTVM using triode. Why are TVMs preferred over VTVMs?

   (b) Explain working of digital frequency meter. **(10+10=20)**

SECTION - C

5. (a) Explain with block diagram the various parts of a CRT. What extra components are needed to make it a CRO? Explain how you would measure frequency using a CRO.

   (b) What is meant by harmonics? What is meant by harmonic distortion? Explain operation of an Heterodyne wave analyzer. **(10+10=20)**

6. (a) Discuss the various applications of C.R.O. for the measurement of voltage, current, phase angle. **(10)**

   (b) Name the three basic instruments used in analysis of harmonics of any periodic non-sinusoidal wave. Describe a harmonic distortion analyzer with the help of a block diagram. **(10)**

SECTION - D

7. (a) What do you understand by multiplexing? Explain frequency division multiplexing and time division multiplexing. Compare their performance. **(10)**

   (b) What are the various methods of analog recording of the signal? Give their advantages, disadvantages and applications. **(10)**

8. (a) Explain main components of data acquisition system. **(10)**

(b) What is magnetic tape recorder? Describe its functioning giving suitable circuit diagram. Also give its merits and demerits. **(10)**

SECTION - E

9. Explain the following:

(i) What is meant by the deflection factor of a CRO?

(ii) Why are electronic instruments becoming more and more popular?

(iii) What is digital multi-meter?

(iv) How is X-Y recorder different from X-t or Y-t recorders?

(v) Explain significance of gauge factor.

(vi) Why are digital transducers preferred over analog transducers?

(vii) What are the uses of data acquisition systems?

(viii) Why is the blanking circuit needed in a CRO?

(ix) What is position telemetry?

(x) What is meant by the terms (i) sensor (ii) transducer? **(10x2=20)**