S.E. Sem 3 (Rev.) Electronic Instrumentation 17/12/08
Extc

288/p3/kst/upq/oct 012/2kl

Con. 5679-08.

(REVISED COURSE)

(3 Hours)

RC- 8924.

[Total Marks : 100

N. B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from the remaining **six** questions.

1. Attempt any **four** questions. 20
   (i) Explain primary and secondary transducers with examples.
   (ii) Explain total harmonic distortion.
   (iii) Why is phosphor screen of CRT provided with an aluminimum layer ?
   (iv) Explain the various sources of error in measurement system.
   (v) Find the conversion time and resolution for a 8 bit counter type ADC and 8 bit successive approximation type of ADC. Assume a clock frequency of 1 MHz.

2. (a) What is the basic principle of wave analyzer ? Explain heterodyne wave analyzer with applications. 10
   (b) Explain R/2R ladder techinique of DAC with 4 bit input. Also suggest the values of resistors if resolution required is 0·5V and reference voltage is 10V. 10

3. (a) Explain the principle, working and construction of LVDT. What is meant by residual voltage ? 10
   (b) With a block diagram explain the elements of network analyzer with its applications. 6
   (c) Which is the fastest ADC and why ? 4

4. (a) Derive gauge factor from the basic principles of strain gauge. A resistance strain gauge with a gauge factor of 4 is cemented to a beam which is subjected to stream of 1×10^{-6}. If original resistance of gauge is 150Ω. Calculate change of resistance. 10
   (b) Explain the principle and operation of digital frequency counter. 6
   (c) Describe the various types of sweeps used in CRO. 4

5. (a) Derive an expression for vertical deflection of electron beam in CRT. What is the minimum distance that will allow full deflection of 4 cm at oscilloscope screen with deflection factor of 100 V /cm and with accelerating potential of 2 kV. 10
   (b) Explain PAM telemetry system. 6
   (c) Write a note on thermocouples. Explain thermoelectric laws. 4

6. (a) Draw and explain the block diagram of DSO. Describe the various modes of operation. 10
   (b) Calculate the value of self capacitance and inductance of the coil when the following measurement is done. At the frequency f_1 = 8 MHz the capacitor is set to 120 pF and when resonated at f_2 = 12MHz the capacitance is 40 pF. 6
   (c) Explain the significance of 3½ and 4½ digit displays. 4

7. (a) Draw and explain true RMS voltmeter with thermocouple. If a sawtooth waveform of amplitude 100 V and timeperiod of 2 sec. is applied to average responding meter, find the percentage error in the meter reading if the scale is caliberated in terms of RMS value of sinusoidal waveform. 10
   (b) Explain briefly the different pulse modulation techniques. 10
