Sixth Semester Examination -2007

ELECTRONICS INSTRUMENTATION AND MEASUREMENT

Full Marks – 70

Time – 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10

   (a) A Lissajous pattern on an oscilloscope is stationary and has 5 vertical Maximum Values and 4 horizontal Maximum Values. The frequency of the horizontal input is 1200 Hz. What is the frequency of vertical input ?

(b) Draw the Lissajous Pattern write two equal voltage of equal frequency and (i) 30° phase shift (ii) 90° phase shift.

(c) In a wien oscillator $R_1 = R_2 = 55$ KΩ and $C_1 = C_2 = 800$ PF. Determine the frequency of oscillations.

(d) Why in signal generators quartz crystal oscillator is used in place of an LC oscillator ?

(e) How is digital multimedia used for measurement of current ?

(f) An 8 bit DAC has a step size of 5 mV. Determine the full scale output voltage and the percentage resolution.

(g) A dual slope integrating type A/D Converter has an integrating capacitor of 0.1 μF and resistance of 100 KΩ. If the

reference voltage is 2V, and the output of the integrator is not to exceed 10V, what is the maximum time the reference voltage can be integrated ?

(h) What are some advantages of using direct synthesis rather than indirect synthesis ?

(i) What is the maximum frequency and resolution for an analyzer using a 1.55 window and a 100 KHz sample rate ?

(j) What method can be used to increase the frequency range of a frequency counter ?

2. (a) Discuss in details the principle of operation of electronic voltmeter with the help of a circuit diagram. 5

(b) Why is an electronic voltmeter more accurate than an ordinary voltmeter ? Write typical specification of an analog multimeter used in the laboratory ? 5

3. (a) Describe with the help of diagram the principle of working of a Dual-Slope integrator type Digital voltmeter 5

(b) Draw the block diagram only for a Digital frequency meter. 5

4. (a) Derive the equation of electrostatic deflection of a beam in CRT and define diflection sensitivity. 4

(b) The Horizonal and Vertical deflection plates of a cathod ray tube have their length of 2.2 cm and the distance between the two pairs of plates is 3.5 cm. Both the pairs of plates are at same potential difference of 100 V (rms). Find

the length of Line produces on the screen at a distance of 35 cm from the centre of near plates. Let Anode Voltage be 1500 V. The distance between the two plates forming a pair is 1.2 cm.. 6

5. (a) Draw Triggered Sweep Circuit and explain it. Draw the block diagram of a Dual trace CRO. 5

(b) What are the advantages of a Sampling CRO over a conventional CRO ? Give typical specification or it. 5

6. (a) Explain the general configuration or radio frequency signal generators and derive conditions for oscillations. 5

(b) Draw the block diagram of a function generator. What are the various pulse parameters used in the specifications of Signal Generator ? 5

7. Draw the block diagram of a Superheterodyne Spectrum analyzer. Explain its operation. How is its resolution improved ? What are its limitations ?

8. Write short notes on : 5×2

(a) Measurement of Noise figure

(b) Potentiometer

(c) Digital Multimeter.