

IV B.Tech I Semester Supplementary Examinations, April/May 2005
DIGITAL INSTRUMENTATION
(Electronics & Instrumentation Engineering)

Time: 3 hours**Max Marks: 70**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain the different type of marking mechanism used in recorders.
(b) Describe the working of a potentiometric type strip chart recorder.
2. (a) Explain the basic components of a tape recorder.
(b) Describe how the pulse duration modulation recording is done in a magnetic tape.
3. (a) Explain with help of a block diagram, a data acquisition system representing A/D converter with an analog multiplexer and the necessary control circuitry.
(b) Show with a sketch how each of there errors, linearity error, gain error, offset error, montonicity will cause the actual output to differ from the expected output in a D/A converter.
4. (a) Draw block diagram of a successive-approximation type A/D converter and briefly describe its operation.
(b) Why is it necessary to use a sample and hold circuit when you are digitizing rapidly changing signal.
(c) How often must a sine wave input be sampled?
(d) Define acquisition time and aperture time for a sample hold.
5. (a) Describe the problem that occurs when you attempt to connect together two RS 232C device that are both configured as DTE. Draw a diagram which shows how this problem can be solved.
(b) Give the signal voltage range for a logic high and for a logic low in the RS 232C standard.
(c) Give the specification for a data acquisition system.
6. (a) Explain with neat diagram the operation of S/H DAC and cyclic DAC.
(b) Describe in detail multiplying DAC.
7. (a) A control valve has a linear variation of opening as the input voltage varies from 0 to 10V. A microprocessor output, an 8bit output word to control valve opening using 8bit D/A converter.
 - i. Find the reference voltage required to obtain full valve opening.
 - ii. Find the percentage of valve opening for all bit change in the input word.

- (b) An analog voltage signal whose highest significant frequency is 1KHZ is to be digitally coded with a resolution of 0.01percent, covering a voltage range of 0-10V. Determine
- Minimum number of bits in the digital code.
 - Analog value of LSB
 - rms value of the quantization error
 - Minimum sampling rate
 - aperture time required for the AD converter
 - Dynamic range of conversion in dB.
8. (a) Explain in detail about analog multiplexing.
- (b) Describe the following in conjunction with D/A converter
- Range of converter
 - MSB
 - LSB
- (c) Explain in detail about data logging.
