

IV B.Tech II Semester Supplementary Examinations, Apr/May 2006
INSTRUMENTATION
(Electrical & Electronic Engineering)

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Distinguish between deterministic signals and random signals. Give suitable examples.
(b) Describe the procedure used to determine whether the sum of two periodic signals is periodic or not. [8+8]
2. (a) Derive the expression for time response of first order system subjected to step input.
(b) A RC circuit consists of a capacitor of $1\mu\text{F}$ in series with a resistor of $1\text{k}\Omega$. A dc voltage of 50V is suddenly applied across the circuit. Calculate the value of voltage after 10 mSecs . [8+8]
3. (a) Explain the functioning of a potentiometric type digital voltmeter.
(b) A $3\frac{1}{2}$ digit of DVM has an accuracy specification of ± 0.5 percent of reading ± 1 digit.
 - i. What is the possible error in volt, when the instrument is reading 5.00 V on the 10 V range?
 - ii. What is the possible error in volt, when reading 0.1 V on the 10 V range?[8+8]
4. Write a short notes on the following:
 - (a) Thermo couple
 - (b) Applications of wave Analyzers.
 - (c) Applications of spectrum Analyzer
 - (d) Importance of Q-meter. [16]
5. (a) A resistive position transducer with a resistance of $5\text{ k}\Omega$ and a shaft stroke of 8 cm is applied with a voltage of 5V . When the wiper is 3cm from the Reference, what is the value of the output voltage?
(b) A resistance strain gauge with a gauge factor 2.04 is fastened to a beam. Which is subjected to a strain of 1×10^{-6} . If the original resistance of the gauge is $120\text{ }\Omega$, calculate the change in resistance? [16]
6. (a) Explain in detail about piezo electric transducer.
(b) Explain in detail the applications of photo devices? [16]

7. (a) Discuss the principle of operation of strain gauge. What is gauge factor? Compare some of the important characteristics of metallic and semiconductor type strain gauges.
- (b) A resistive strain gauge with a gauge factor of 2 is fastened to a member which is subjected to a strain of 1×10^{-6} . If the original value of gauges is 130 ohms, calculate change in resistance. [10+6]
8. (a) Describe the measurement of liquid level using capacitive transducer in case of Insulating and conducting liquids.
- (b) Explain how the capacitance transducers are used in measurement of non-electrical quantities? Give neat sketch. [8+8]
