

**M. Tech.****APPLIED INSTRUMENTATION****SUBJECT CODE : ELE - 513 (Elective - II)****Paper ID : [E0492]**

[Note : Please fill subject code and paper ID on OMR]

**Time : 03 Hours****Maximum Marks : 100****Instruction to Candidates:**

- 1) Attempt any **Five** questions.
- 2) All questions carry equal marks.

- Q1)** (a) Define Transducers and give classification of transducers.  
(b) Discuss steps for selecting transducers in development of an instrumentation.
- Q2)** (a) Distinguish between static and dynamic response of a transducer system.  
(b) Explain the following types of errors for a transducer :  
(i) Dynamic errors &  
(ii) Noise and drift errors.
- Q3)** (a) Explain with a diagram the operation of a Liquid Level measurement system using an electrical type transducer.  
(b) Give schematic diagram of a variable resistance potentiometric transducer and give its input-output characteristic with Loading effect included. Also give advantages and disadvantages of potentiometric transducer.
- Q4)** (a) Draw a block diagram representation of a Telemetry system identifying important components in it. Why & how the signal is required to be processed before transmission by such a system?  
(b) Show the schematic diagram of a telemetry system using frequency division multiplexing and demultiplexing. What is standardized value of FM-modulation index if subcarrier freq. of 1300 Hz is available with data cutoff frequency of 20Hz. Calculate LBEF & HBEF in the PBW-specification.

- Q5)** (a) List various types of display device and give a comparison between an analogue and digital displays.
- (b) Give characteristics of digital displays. What is the error in the measurement of 0.1V in the 10V range of 4½-digit voltmeter having an accuracy of  $\pm 0.1\%$  of the reading  $\pm 1$ ?
- Q6)** (a) What is Data Acquisition system? Why is ADC - converter needed - explain.
- (b) Enumerate various ADC techniques normally used in signal conditioning. Draw the circuit diagram of a dual-slope A/D-converter and explain its operation.
- Q7)** (a) Discuss Fibre optic technology of data transmission.
- (b) Discuss working of a Q-meter.
- Q8)** Write short notes on :
- (a) SCADA (supervisory control & data acquisition systems).
- (b) Electrical noise in control signals & its remedial measures.

