

Date:28-02-2022

Registration number:

**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BENGALURU-27**

**B.Sc. ELECTRONICS - V SEMESTER**

**SEMESTER EXAMINATION: OCTOBER 2021**

**(Examination conducted in March 2022)**

**EL 5118 - Data Acquisition and Instrumentation**

Time- 2 ½ hrs Max Marks-70

This question paper contains **TWO** printed pages and **THREE** parts

 **Part A 5x8 = 40**

**Answer any 5 questions**

1. (a). What are the parameters considered while selecting a transducer?

(b). Explain the working of a Thermocouple.

 4+4

1. (a). Explain the principle of operation of reluctance transducer.

(b). Explain the working of LVDT.

 4+4

1. (a). What are the various categories of photo electric transducer? Explain the working of photo diode with relevant illumination characteristics.

(b). Give different objectives of general data acquisition system (DAS).

 4+4

1. (a). Explain the working of three-bit flash type Analog to Digital converter with necessary block diagram.

(b). With the necessary diagram explain the working of dual slope type digital voltmeter.

 4+4

1. (a). With the necessary block diagram explain the working of frequency meter.

(b). With the block diagram explain the working of dual trace type oscilloscope.

 4+4

1. (a). Draw and explain the block diagram of IC8038 for generating various waveforms.

(b). Explain the working of liquid crystal display.

 4+4

1. (a). Explain the working of capacitive touch screens.

 (b). Compare between LED and Plasma display. 4+4

 **Part B 5x4=20**

**Answer any 5 questions**

1. A resistance wire strain gauge uses a soft iron wire of small diameter. The gauge factor is +4.2. Neglecting the resistive effects, calculate the Poisson’s ratio.
2. A thermistor has a resistance of 3980 Ω at the ice point (0°C) and 794 Ω at 50°C. The resistance temperature relationship is given by RT = aR0(b/T). Calculate the constants a and b.
3. An LVDT with a secondary voltage of 5V has a range of ± 25mm. Find the output voltage versus core position for a core movement going from +18.75mm to -10mm.
4. A 6-bit DAC has a step size of 50 mV. Determine the full-scale output voltage and the percentage resolution.
5. An 8-bit Successive approximation DAC has a resolution of 30 mV. What will be its digital output for an analog input of 2.86V?
6. A 4 $\frac{1}{2}$ digit voltmeter is used for voltage measurements.

(a). Find its resolution

(b). How would 12.98V be displayed on 25V range?

(c). How would 0.6973 be displayed on 1V range?

(d). How would 0.6973 be displayed on 10V range?

1. In a CRO, if the horizontal frequency fx is 1 kHz, determine the vertical frequency fy for the following Lissajous figures.



 **Part C 5x2=10**

**Answer any 5 questions**

1. What is the difference between sensor and a transducer?
2. What is a helipot?
3. What is the difference between active and passive transducer? Give one example for an active transducer.
4. Give two important factors which decide the configuration of data acquisition system.
5. Explain the term monotonicity w.r.t. DAC.
6. Give two characteristics of LCD display.
7. Differentiate between OLED display and DLP.

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