

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
First Semester 2022-2023
End-semester exam (Closed Book)
INSTR F311-Electronic Instruments and Instrumentation Technology

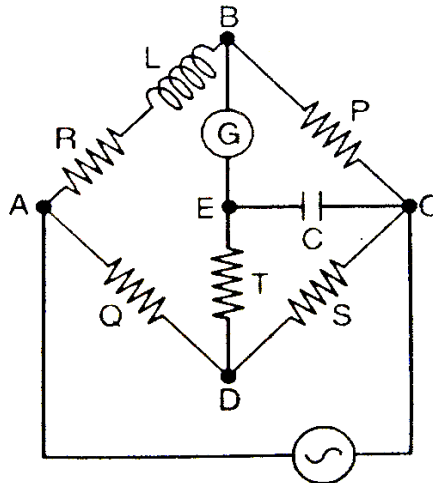
Time: 90 Minutes

Max Marks:60

Date 26.12.2022

- 1) A bridge circuit shown in Figure 1 is used to find the value of L and R of a certain coil connected between the points A and B. Derive the expressions for R and L in terms of P, Q, S, C and T when the bridge is balanced. [15]

Figure 1

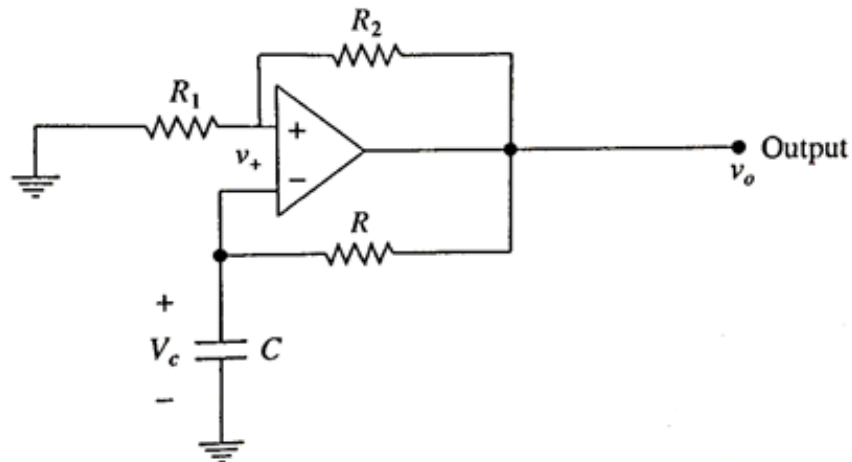


- 2) Show that the time period T of an astable multivibrator circuit shown in Figure 2 to be

$$T = 2RC \log_e(3)$$

along with necessary waveforms (Given data: $R_1 = R$ and $R_2 = R$). [15]

Figure 2



- 3) A DSO probe has an impedance of $200\text{k}\Omega$ in parallel with a capacitance of 20pF is used to measure the voltage between terminals A and B as shown in Figure 3.

- (i) Find the true value of voltage between the terminals A and B (voltage across Z).
- (ii) The actual voltage (V_{measured}) measured by the DSO using this probe will be?

(Given data: $R = 100\text{k}\Omega$, Z is a pure capacitance with $C = 10\text{pF}$).

[4+6]

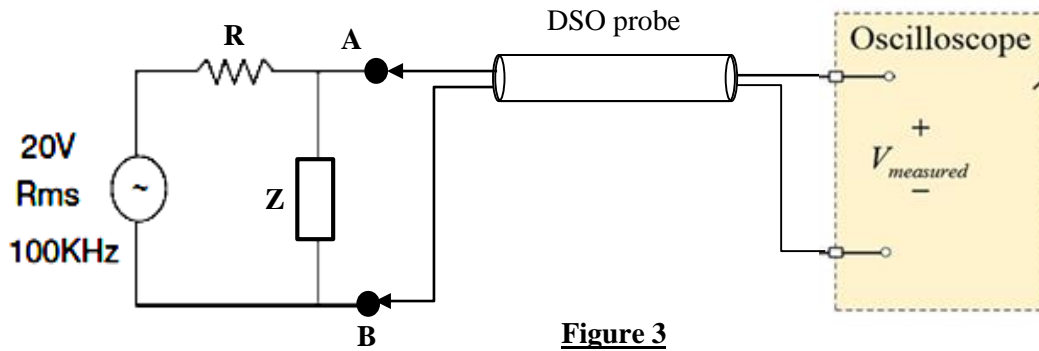


Figure 3

- 4) Explain the operation of a dual slope integrating type DVM shown in Figure 4 with necessary equations and waveforms. (Assumptions can be made as required). [10]

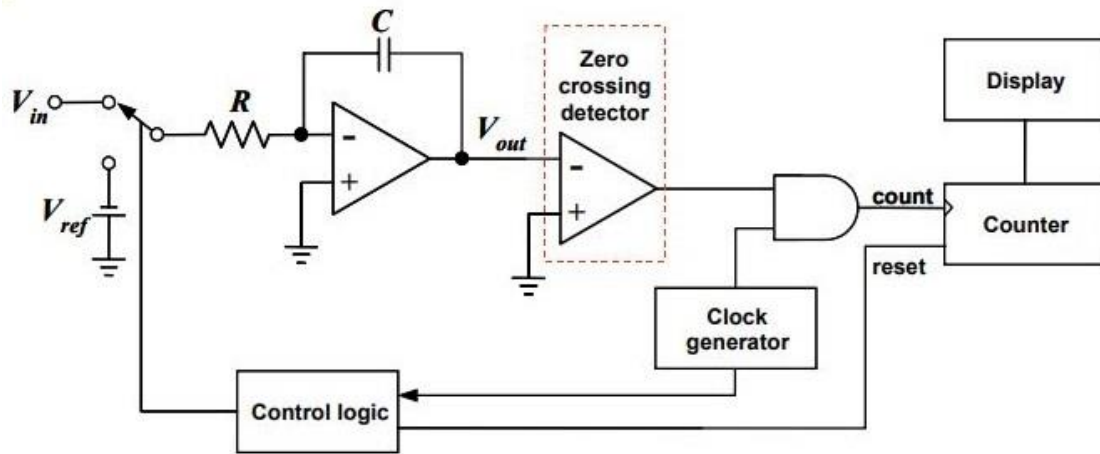


Figure 4

- 5) (i) Specify and explain the character frame format of RS 232. [5]
- (ii) State some examples of hazardous locations that are classified under Class I, Class II and Class III respectively. [5]

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