

Reg. No. :

Question Paper Code : 20515

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2022.

Fourth Semester

Electrical and Electronics Engineering

EE 8403 – MEASUREMENTS AND INSTRUMENTATION

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Compare Analog and Digital Voltmeters.
2. Draw the functional block diagram of an instrument.
3. Specify the use of instrument transformers.
4. Suggest the instruments to measure frequency and phase.
5. Compare Maxwells bridge and Anderson bridge.
6. Specify the different grounding techniques adopted.
7. Compare LED and LCD.
8. Specify the application of data loggers.
9. Mention the selection parameters considered for transducers.
10. List the uses of Thermal Imagers.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the different types of errors in measurement and suggest few statistical evaluation of measurement data.

Or

- (b) Explain the working of moving coil instrument and derive its torque equation.

12. (a) Illustrate the working principle of single phase energy meter with a neat sketch and derive its torque equation.

Or

- (b) Describe the step by process involved in determination of B-H curve and hysteresis loop.

13. (a) Draw a neat bridge circuit for measurement of resistance and derive the necessary equations to find the medium resistance.

Or

- (b) Derive the expression for measurement of unknown inductance using Hays bridge with a neat circuit.

14. (a) Explain in detail about the any one type of digital plotter and printer.

Or

- (b) Elaborate the working principle of CRT display and its use in digital CRO.

15. (a) Elaborate the types of digital transducers.

Or

- (b) Elucidate the element of data acquisition system.

PART C — (1 × 15 = 15 marks)

16. (a) Discuss about the electrostatic and electromagnetic interference the exist in the measuring bridge circuits and suggest the methods of screening required to overcome them.

Or

- (b) (i) A Schering bridge is applied to measure the capacitance and loss angle of a H.V. bushing. At balance, the observations were the value of the standard condenser, $C_1 = 100 \text{ pF}$, $R_3 = 3180 \text{ ohm}$, $C_3 = 0.00125 \text{ microF}$, $C_4 = 500 \text{ pF}$ and $R_4 = 636 \text{ ohm}$. Determine the value of capacitance of the bushing.

- (ii) Prove that Schering bridge equation as stated below :

$$R_1 = \frac{R_3 C_4}{C_2}$$

$$C_1 = \frac{R_4 C_2}{R_3}$$