

Roll No.

Total Pages : 3

007602

May 2024

B.Tech. (EL) (Sixth Semester)

Electrical Measurements and Instrumentation
(ELPC-602)

Time : 3 Hours]

[Maximum Marks : 75

Note : It is compulsory to answer all the questions (1.5 marks each) of Part A in short. Answer any *four* questions from Part B in detail. Different sub-parts of a question are to be attempted adjacent to each other. Assume the relevant data wherever required.

Part A

1. (a) How are the instrumental errors are different from gross errors ? 1.5
- (b) How is the current range of a PMMC instruments extended with the help of shunts ? 1.5
- (c) What is the power factor of a meter ? 1.5
- (d) Classify the resistance according to the range. 1.5
- (e) Why is it preferable in bridge circuit, that the equations of balance are independent of frequency ? Explain. 1.5

- (f) Summarize the advantages of LVDT. 1.5
- (g) What is loading effect in volt-meters ? 1.5
- (h) Explain the term creeping in energy meter. 1.5
- (i) What is the purpose of sampling in DSO ? 1.5
- (j) Write the selection Criteria of Transducer. 1.5

Part B

- 2. (a) Describe the various operating forces needed for proper operation of an analog indicating instrument. 8
- (b) Describe the different methods of producing controlling torque in an analog instrument. List their advantages and disadvantages. 7
- 3. (a) Derive the torque equation for an electro-dynamometer type of wattmeter. Comment upon the shape of scale if spring control is used. 8
- (b) Discuss the main sources of errors in electro-dynamometer type instruments. Explain their advantages and disadvantages. 7

- 4. Derive the expression for deflecting torque in single phase induction type meter. With the help of phasor diagram show that the deflection is max. when the phase angle between two fluxes is 90 and when the disc is purely inductive. 15
- 5. (a) Explain the loss of charge method for measurement of insulation resistance of cables. 8
- (b) Draw the circuit of a Kelvin's Double Bridge used for measurement of low resistances. Derive the condition for balance. 7
- 6. (a) Explain why Maxwell's Inductance - Capacitance Bridge is useful for measurement of inductance of coils having storage factor between 1 and 10 ? 8
- (b) Describe the working of low voltage Schering Bridge. Derive the expression for capacitance and dissipation factor. 7
- 7. (a) List the three types of temperature transducers and describe the application of each. 8
- (b) Write a short note on speed and motion sensors. 7