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18EE36

**Third Semester B.E. Degree Examination, July/August 2022**  
**Electrical and Electronic Measurements**

Time: 3 hrs.

Max. Marks: 100

**Note: Answer any FIVE full questions, choosing ONE full question from each module.**

**Module-1**

- 1 a. Define sensitivity of galvanometer. Draw Wheatstone's bridge and derive balance equation. (08 Marks)
- b. A Wheatstone Bridge has  $P = 1K\Omega$ ,  $Q = 100\Omega$ ,  $R = 2005\Omega$  and  $S = 200$ . Find  $\Delta R$  if bridge is not balanced. If the galvanometer sensitivity is  $(S_i) 10\text{mm}/\mu\text{A}$ , applied voltage is  $5\text{V}$  and internal resistance of galvanometer is  $100\Omega$ . Find the deflection of the galvanometer. (12 Marks)

**OR**

- 2 a. Draw a neat circuit diagram and explain Desauty's modified bridge and derive relevant equation. (08 Marks)
- b. Explain how Schering bridge can be used to measure relative permittivity of dielectric material. (08 Marks)
- c. Explain fall of potential method of measuring earth resistance. (04 Marks)

**Module-2**

- 3 a. Derive the torque equation of a dynamometer type of wattmeter. List the errors that occur in it. (08 Marks)
- b. Explain :  
i) Weston frequency meter  
ii) Phase sequence indicators. (12 Marks)

**OR**

- 4 a. Explain the construction and working of a single phase power factor meter. (08 Marks)
- b. A  $230\text{V}$  energy meter disc makes 10 revolutions when connected to a resistive load of  $600\text{W}$  in 10 mins. Calculate the meter constant. (06 Marks)
- c. Discuss the various adjustment required in energy meters for accurate reading. (06 Marks)

**Module-3**

- 5 a. What are shunts and multipliers and explain how they are used to extend instrument range derive relevant expressions. (08 Marks)
- b. A moving coil meter gives full scale deflection with a current of  $5\text{mA}$ . If the coil of the instrument has a resistance of  $10\Omega$  how can it be adopted to work as :  
i) Ammeter of range  $(0 - 10\text{A})$   
ii) Voltmeter of range  $(0 - 10\text{V})$ . (08 Marks)
- c. Explain turns compensation used instrument transformers. (04 Marks)

**OR**

- 6 a. Draw a neat circuit diagram and explain Silbee's method of testing Current Transform (CT). (12 Marks)
- b. With the help of a neat circuit diagram explain how flux density can be measured in a ring specimen. (08 Marks)

**Module-4**

- 7 a. List the advantage of electronic instruments. (04 Marks)  
b. Explain construction and working of :  
i) True RMS reading voltmeter  
ii) RAMP type digital voltmeter. (16 Marks)

**OR**

- 8 a. Draw the block diagram of a electronic energy meter and explain its working. List its advantages. (12 Marks)  
b. Explain the construction and working of a successive approximation type DVMS. (08 Marks)

**Module-5**

- 9 a. With relevant diagrams explain :  
i) Seven segment displays  
ii) Liquid crystal displays. (08 Marks)  
b. Explain the working of Cathode Ray Tube (CRT) with a neat diagram. (08 Marks)  
c. What are Bar graph displays and where are they used? (04 Marks)

**OR**

- 10 a. List the different types of recording devices and explain LVDT and strip chart types. (10 Marks)  
b. Explain the following :  
i) Nixie tubes  
ii) ECG. (10 Marks)

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