SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR

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QUESTION BANK (DESCRIPTIVE)

Subject with Code : Electrical Measurements (18EE0212) **Course & Branch**: B.Tech– EEE

Year &Sem: III-B.Tech& I-Sem. **Regulation:** R18

UNIT –I

MEASURING INSTRUMENTS

1. (a) Define the terms "Indicating instruments", "Recording instruments" and integrating Instruments". Give examples of each case. [L1][CO1][5M]

(b) Explain the construction and working of PMMC type instruments. [L2][CO1][5M]

2. Explain the working of universal shunt used for multi range ammeters and derive expressions for resistances of different sections of a universal shunt for 3 range ammeter. [L2, L4][CO1][10M]

3. Design an Aryton shunt to provide an ammeter with the current ranges 1 A, 5 A and 10 A. The basic meter resistance is 50 ohm and full scale deflection current is 1 mA [L4][CO1][10M]

4. (a) How the electrical measuring instruments are classified? [L1][CO1][5M]

(b) Discuss about errors and compensations of measuring instruments. [L2][CO1][5M]

5.(a)Derive an expression for the Deflecting torque in MI type instruments [L4][CO1][5M]

(b) List the advantages & disadvantages of MI type instruments [L1][CO1][5M]

6 (a) Describe the construction and working of attraction type MI instrument? [L2[CO1]][5M]

(b) A moving coil instrument has a resistance of 10 ohm and gives a full scale deflection When carrying 50mA. Show how it can be adopted to measure voltage upto 750 V and current of 100 A. [L4][CO1][5M]

7. How do you extend the range of an Ammeter? Explain Aryton Shunt with diagram. [L1, L2][CO1][10M]

8. Explain briefly Quadrant type Electrometer. Explain Heterostatic or Idiostatic Connections [L2, L4][CO1][10M]

9. Explain the working of Kelvin Absolute Voltmeter. What are the advantages and disadvantages of Electrostatic Instruments? [L2, L4][CO1][10M]

10.Write short notes on

(i) Classification of instruments. **[L1][CO1][2M]**

(ii) Eddy current Damping. **[L1][CO1][2M]**

(iii) Ammeter range extension. **[L1][CO1][2M]**

(iv) Applications of Electrostatic Voltmeter. **[L1][CO1][2M]**

(v) Voltmeter range extension. **[L1][CO1][2M]**

UNIT- II

DC and AC BRIDGES

1. (a) Draw the circuit diagram of a Wheatstone bridge and derive the condition for balance. [L1, L4] [CO2] [5M]

(b) The four arms of Wheatstone bridge as follows: AB = 5KΩ ; BC =? ; CD = 10Ω ; DA = 2KΩ .What should be the resistancein the arm for no current through the Galvanometer? [L4] [CO2] [5M]

2.Explain how insulation resistance of a cable can be measured with a help of Loss of charge method? [L2] [CO2] [10M]

3. (a) Draw the circuit of a Kelvin's double bridge used for measurement of low resistances. Derive the condition for balance. [L1, L4] [CO2] [5M]

(b) Explain classification of resistances. [L2] [CO2] [5M]

4. An ac bridge circuit working at 1 KHz has its arms as follows:
Arm AB: 0.2 µf capacitance
Arm BC: 500 ohm resistor
Arm CD: unknown impedance
Arm DA: 300 ohm resistor in parallel with 0.1µf capacitor
Find R and L or C constants of the Arm CD considering it as a series circuit. [L4] [CO2] [10M]

5. Explain how Wien's bridge can be used for experimental determination of frequency. Derive the expression for frequency in terms of bridge parameters. [L2, L4] [CO2] [10M]

6. (a) Explain the features of De-Sauty'sBridge with a neat sketch. [L2] [CO2] [5M]

(b) List the advantages and disadvantages of Maxwell's Bridge. [L1] [CO2] [5M]

7. Explain the construction and working of Anderson Bridge with suitable diagrams. [L2] [CO2] [10M]

8. Derive the general balance equation of DC and AC Bridges with suitable diagrams. What are the balance condition equations in polar and Rectangular forms? [L4] [CO2] [10M]

9. Explain substitution method and potentiometer method for measuring medium resistances. [L2] [CO2] [10M]

10. Write short notes on

(i) Sensitivity of Wheatstone bridge. [L1] [CO2] [2M]

(ii) Balance equation of DC Bridge. [L1] [CO2] [2M]

(iii) Substitution method [L1] [CO2] [2M]

(iv) Ammeter- Voltmeter method [L1] [CO2] [2M]

(v) Advantages of AC Bridge. [L1] [CO2] [2M]

UNIT – III

MEASUREMENT OF POWER AND ENERGY

1. **Give the constructional details of electro dynamometer type wattmeter with a neat sketch. [L1, L2] [CO3] [10M]**

2. **(a) Discuss the errors of single phase energy meter. [L2] [CO3] [5M]**

   (b) A 50A , 230 V meter on full load test makes 61 revolutions in 37 seconds . If the normal disc speed is 520 revolutions per Kwh , find the percentage error . [L4] [CO3] [5M]

3. **(a) A single phase kilo watt hour meter makes 500 revolutions per kilo watt hour. It is found on testing as making 40 revolutions in 58.1 seconds at 5KW full load. Find the percentage error. [L4] [CO3] [5M]**

   (b) Explain driving system , moving system and braking system in a single phase induction type energy meter. [L2] [CO3] [5M]

4. **(a) Explain the measurement of LPFand UPF. [L2] [CO3] [5M]**

   (b) Explain creeping and its compensation in 1-Ø induction type energy meter.[L2][CO3][5M]

5. **(a) Explain the friction compensation in single phase induction type Energy Meter. [L2] [CO3] [5M]**

   (b). Explain stray magnetic field errors in electro dynamometer type wattmeter. [L2][CO3][5M]

6. **(a) Explain the construction of Two element and Three element dynamometer wattmeters. [L2] [CO3] [5M]**

   (b) Derive the torque equation for electro dynamo meter type wattmeter. [L4] [CO3] [5M]

7. **(a) Explain errors caused by vibration of moving system electro dynamometer type wattmeter. [L2] [CO3] [5M]**

   (b) Explain the advantages and disadvantages of single phase Induction type Energy meter. [L2] [CO3] [5M]

8. **Explain with a neat sketch the construction and working of a single-phase Dynamometer type Wattmeter. [L2] [CO3] [10M]**

9. Explain the working of 2 element energy meter with a neat diagram. [L2] [CO3] [10M]

10. Write short notes on

(i) Advantages of Two element wattmeter [L1] [CO3] [2M]

(ii) Creeping error [L1] [CO3] [2M]

(iii) Driving and braking torque [L1] [CO3] [2M]

(iv) LPF [L1] [CO3] [2M]

(v) Errors in Dynamometer type wattmeter. [L1] [CO3] [2M]

UNIT –IV

INSTRUMENT TRANSFORMERS AND POTENTIOMETERS

1. (a) Discuss C T and P T. [L2] [CO4] [5M]

(b) Why secondary of C.T should not be open? [L1] [CO4] [5M]

2. Explain the construction of (i) Current transformer (ii) Potential transformer. [L2] [CO4] [10M]

3. (a) With neat figure explain the working of an AC Potentiometer. [L2] [CO4] [5M]

(b)Discuss the significance of standardization. [L2] [CO4] [5M]

4. (a) How do you Standardize a Potentiometer? Explain with a neat diagram. [L2] [CO4] [5M]

(b) Discuss slide wire DC Potentiometer. [L2] [CO4] [5M]

5. (a) Explain construction and working principle of Crompton's DC potentiometer. [L2] [CO4] [5M]

(b) Explain the term "Standardization" of Potentiometer. [L2] [CO4] [5M]

6 . (a) Explain the applications of DC potentiometers. [L2] [CO4] [5M]
(b) List the advantages of potentiometers [L1] [CO4] [5M]

7. (a) How do you measure current and voltage using potentiometer. [L1] [CO4] [5M]

(b) Describe the construction and working of co-ordinate type Potentiometer & its standardization. [L2] [CO4] [5M]

8.(a) List the applications of A C potentiometers. [L1] [CO4] [5M]
(b) Describe the construction and working of Polar type Potentiometer & its standardization. [L2] [CO4] [5M]

9 (a) Describe the construction and working of a d.c potentiometer. [L2] [CO4] [5M]

(b) What is standardization? Explain [L1, L2] [CO4] [5M]

10.Write short notes on

(i) Advantages of Crompton potentiometer [L1] [CO4] [2M]

(ii) How the CT and PT are connected in the circuits [L1] [CO4] [2M]

(iii) Why secondary of C.T should not be open? [L1] [CO4] [2M]

(iv) Standardization" of Potentiometer [L1] [CO4] [2M]

(v) Slide wire DC potentiometer [L1] [CO4] [2M]

UNIT – V

MAGNETIC MEASUREMENTS

1. (a) Derive the equation of motion for Ballistic Galvanometer. [L4] [CO5] [5M]

(b) Explain six point methods. [L2] [CO5] [5M]

2. (a) Explain the construction and working principle of Flux meter with a neat diagram. [L2] [CO5] [5M]

(b) Determine leakage factor with flux meter. [L1] [CO5] [5M]

3.(a) Prove that in a Ballistic Galvanometer, the charge is proportional to first swing of the moving coil. [L4] [CO5] [5M]

(b) compare flux meter and Ballistic Galvanometer [L2] [CO5] [5M]

5.(a) How do you measure leakage factor using Flux meter. [L1] [CO5] [5M]

(b) Explain the method of measuring core losses using A.C potentiometer method. [L2] [CO5] [5M]

6 . Describe the method for determination of B.H curve of a magnetic material using:

(i) Method of Reversals (ii) Six point method. [L2] [CO5] [5M]

7. Describe briefly how the following measurements can be made with the use of CRO
(i) Frequency (ii) Phase angle (iii) voltage. [L2] [CO6] [10M]

8. (a) List the advantages & applications of C R O. [L1] [CO6] [5M]
(b) Draw a neat figure and explain the working of a C R O. [L1, L2] [CO6] [5M]

9. Describe the construction and working of a moving coil ballistic galvanometer. [L2] [CO6] [10M]

10. Write short notes on

(i) Flux meter [L1] [CO5] [2M]

(ii) Ballistic galvanometer [L1] [CO5] [2M]

(iii) Measurement of permeability [L1[CO5]][2M]

(iv) Lissajouis pattern [L1] [CO6] [2M]

(v) Magnetic measurement. [L1] [CO6] [2M]

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