SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR

Siddharth Nagar, Narayanavanam Road – 517583

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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UNIT –I

MEASURING INSTRUMENTS

1. The scale is not uniform in [ ]
   (A) M.I.Instrument (B) M.C Instrument
   (C) Energy meter (D) All
2. An ammeter is a [ ]
   (A) Secondary instrument (B) absolute instrument
   (C) Recording instrument (D) integrating instrument
3. The essential requirement of measuring instrument is [ ]
   (A) Deflecting torque (B) controlling torque
   (C) Damping torque (D) all
4. Moving iron instrument can be used on [ ]
   (A)ac& dc both (B) ac only
   (C) dc only (D) half wave rectified ac
5. Moving coil permanent magnet instruments can be used on [ ]
   (A) Ac & Dc both (B) ac only
   (C) dc only (D) half wave rectified ac
6. Which of the following are integrating instruments [ ]
   (A) Ammeter (B) voltmeter
   (C) wattmeter (D) ampere hour and watt hour meters
7. In majority of instruments damping is provided by [ ]
   (A) Fluid friction (B) spring
   (C) eddy currents (D) all the above
8. The degree of closeness of the measured value with the true value is [ ]
   (A) Error (B) Accuracy
   (C) Resolution (D) Absolute error
9. Shunts are used to extend the range of [ ]
   (A) Voltmeter (B) Ammeter
   (C) wattmeter (D) energy meter
10. The scale is uniform in [ ]
    (A)M.I.Instrument (B) M.C Instrument
    (C) Energy meter (D) All

11. The function of series resistance in voltmeter is to [ ]
    (A) Bypass the current (B) increase the sensitivity of the ammeter
    (C)Increase the resistance of ammeter (D) none of the above
12. The torque which brings the pointer back to its zero position is called [ ]
    (A)Controlling torque (B) deflecting torque

(C) Damping torque (D) oscillation

13. The deflection sensitivity of a CRO is given by [ ]
(A) Volts/div (B) Current/div
(C) units/div (D) All

14. The output of an analoginstrument can be interfaced with external devices [ ]
(A) True (B) False
(C)Cannot be concluded (D) None

15. An ammeter is a [ ]
(A) Secondary instrument (B) absolute instrument
(C) Recording instrument (D) integrating instrument

16. In a portable instrument, the controlling torque is provided by [ ]
(A)Spring (B) gravity
(C) Eddy currents (D) all of the above

17. The function of shunt in an ammeter is to [ ]
(A)by pass the current (B) increase the sensitivity of the ammeter
(C)Increase the resistance of ammeter (D) none of the above

18. The torque which brings the pointer back to its zero position is called [ ]
(A)Controlling torque (B) deflecting torque
(C) damping torque (D)oscillation

19. ____ method is used for measuring low resistance [ ]
(A) Kelvin double bridge (B) Substitution
(C) Loss of Charge (D) All

20. The spring material used in a spring control device should have the following property.[ ]
(A) Should be non-magnetic (B) Most be of low temperature co-efficient
(C) Should have low specific resistance (D) All

21. A ___ device prevents the oscillation of the moving system and enables the latter to reach itsfinal position quickly [ ]
(A) Deflecting (B) controlling
(C) damping (D) any of the above

22. Which of the following properties damping oil must possess? [ ]
(A) Must be a good insulator
(B) Should not have corrosive action upon the metal of the vane
(C) The viscosity of the oil should not change with the temperature
(D) All of the above

23. In a portable instrument, the controlling torque is provided by [ ]
(A)spring (B) gravity
(C) eddy currents (D) all of the above

24. The function of shunt in an ammeter is to [ ]
(A)Bypass the current (B) increase the sensitivity of the ammeter
(C) Increase the resistance of ammeter (D) none of the above

25.The torque which brings the pointer back to its zero position is called [ ]
(A) Controlling torque (B) deflecting torque
(C) damping torque (D)oscillation

26. The essential requirement of measuring instrument is [ ]
(A)Deflecting torque (B) controlling torque
(C) Damping torque (D) all the above

27. Moving iron instrument can be used on [ ]
(A)ac& dc both (B) ac only
(C) dc only (D) half wave rectified ac

28. Moving coil permanent magnet instruments can be used on [ ]

(A)ac& dc both (B) ac only
(C) dc only (D) half wave rectified ac

29. Which of the following are integrating instruments [ ]
(A) Ammeter (B) Voltmeter
(C) Wattmeter (D) Ampere Hour and Watt Hour Meters

30. In majority of instruments damping is provided by [ ]
(A) Fluid friction (B) spring
(C) eddy currents (D) all the above

31. The amount of deflection depends on ___of the galvanometer [ ]
(A)Sensitivity (B) Resistivity
(C) Voltage (D) None

32. ____ method is used for measuring high resistance [ ]
(A)Ammeter-Voltmeter (B) Substitution
(C) Loss of Charge (D) All

33. The ____ in its simplest form consists of 4 resistive arms forming a closed circuit [ ]
(A)Bridge (B) Circuit
(C) capacitance (D) Balance

34. In the electrical instruments, cramped scale is observed due to **[ ]**
(A)gravitycontrol (B)springcontrol
(C) Air friction (D) None of these

35. The best material for use for standard resister is **[ ]**
(A)manganin (B)aluminium
(C)nichrome (D) platinum

36. Electrostatic type instruments are primarilyused as **[ ]**
(A)Ammeters (B) wattmeter
(C) voltmeters (D) Ohmmeter

37. Which of the following types of instrument is an integrating instrument **[ ]**
(A)power factor meter (B)energy meter
(C)wattmeter (D) frequency meter

38. Electrostatic type instruments are primarilyused as **[ ]**
(A)Ammeters (B) wattmeter
(C) voltmeters (D) Ohmmeter

39. The scale is not uniform in [ ]
(A) M.I.Instrument (B) M.C Instrument
(C) Energy meter (D) All

40. Which of the following instruments indicate the instantaneous value of the electrical quantity being measured at the timeat which it is being measured ? [ ]
(A) Absolute instruments (B) Indicating instruments
(C) Recording instruments (D) Integrating instruments

UNIT-II

DC AND AC BRIDGES

1. The general balance condition for AC bridge is given by [ ]
   (A)Z1Z4=Z2Z3 (B) Z1Z2=Z3Z4
   (C)Z1Z3=Z2Z4 (D) None
2. De Sauty bridge is used to measure [ ]
   (A) Inductance (B)Capacitance
   (C)Frequency (D)Resistance
3. The amount of deflection per unit current is called [ ]
   (A)Sensitivity (B)Resistivity
   (C)Power (D) Gravity
4. The sensitivity of Wheatstone bridge is given by _____ [ ]
   (A)Deflection/Current (B) Deflection X current
   (C) Deflection-current (D)none
5. An AC bridge is said to be balanced when _ flows through the galvanometer . [ ]
   (A)zero current (B) equal currents
   (C) max current (D) none
6. Capacitance can be calculated with _____bridge. [ ]
   (A) Anderson bridge (B) de sauty bridge
   (C) hay's bridge (D)Wein bridge
7. Which bride is used for the measurement of low resistance? [ ]
   (A)Kelvin (B) Wheatstone
   (C) hay's (D) Wagner ground bridge
8. Medium resistances in the range from [ ]
   (A)1Ω to 0.1MΩ (B) 1Ω to 0.5 MΩ
   (C) 1Ω to 0.1kΩ (D) 1.Ω to 0.01MΩ
9. Bridge balance is obtained in De Sauty's bridge only if capacitors are [ ]
   (A)air type (B) gas type
   (C) Vacuum type (D) Electrolyte
10. The four impedances are Zab=400L50, Zbc=800L-50, Zad=200L40
    And Zcd=400L20. The bridge is said to be [ ]
    (A) Balanced (B) unbalanced
    (C) cannot be determined (D) Damped
11. Balance condition for Wheatstone is given by [ ]
    (A) R1R2=R3R4 (B) R1R3=R2R4
    (C)R1R4=R2R3 (D) NONE
12. The amount of deflection per unit current is called [ ]
    (A)Sensitivity (B)Resistivity
    (C)Power (D) Gravity
13. Example of high resistance is [ ]
    (A)Shunt resistance (B)Insulation resistance
    (C) Field winding (D) Armature resistance
14. Measurement of high resistance is done by [ ]
    (A)Ammeter-voltmeter (B)Wheatstone bridge
    (C)Loss of charge method (D)All
15. The general balance condition for AC bridge is given by [ ]
    (A) Z1Z4=Z2Z3 (B) Z1Z2=Z3Z4
    (C)Z1Z3=Z2Z4 (D) None

16. De Sauty bridge is used to measure [ ]
(A) Inductance (B)Capacitance
(C)Frequency (D)Resistance

17. In an Anderson bridge, the unknown inductance is measured in terms of [ ]
(A) Known inductance and resistance (B) known capacitance and resistance
(C) Known resistance (D) known inductance

18.The sensitivity of Wheatstone bridge is given by _____ [ ]
(A) Deflection/Current (B) Deflection X current
(C) Deflection-current (D)none

19.Examples of high resistances are ____.. [ ]
(A)armature resistance (B)ammeter shunt
(C) insulation (D) lamp filament

20. An AC bridge is said to be balanced when _____ flows through the galvanometer. [ ]
(A)zero current (B) equal currents
(C) max current (D) none

21. The balance condition of an (((A)C bridge is _____. [ ]
(A) Z1Z2=Z3Z4 (B) Z1Z4=Z2Z3
(C) Z1Z3=Z2Z4 (D)Z1Z4=Z2/Z3

22. A _____ in its simplest form consists of network of 4 resistive arms forming a closed circuit. [ ]
(A)Bridge circuit (B) inductive circuit
(C) capacitive circuit (D) none

23. All the resistances from 1 ohm and upto 0.1 Mohm are classified as [ ]
(A) Low resistance (B) medium resistance
(C) high resistance (D) unknown

24. Capacitance can be calculated with _____bridge. [ ]
(A)Anderson bridge (B) de sauty bridge
(C) hay's bridge (D)Wein bridge

25. The Wien bridge is used for the measurement of _____. [ ]
(A) capacitance (B) inductance
(C) frequency (D) resistance

26. If four impedances are Zab= 400L50 Zad= 200L40 , Zbc= 800L-50 and Zcd= 400L20, then the bridge is said to be ____ [ ]
(A)Balanced (B) unbalanced
(C) under balanced (D) over balanced

27. Which of the following has low resistance? [ ]
(A)Armature resistance of large generator (B) 60W lamp resistance
(C) Field winding of an alternator (D) Insulation resistance of a machine

28. Error due to the resistance of leads and contact exterior to the actual bridge circuit play a role in the measurement of _ _ _ _ _ _ _ _ resistance values. [ ]
(A)very low (B) High
(C) Medium (D) cable wire

29. Which bride is used for the measurement of low resistance ? [ ]
(A)Kelvin (B) Wheatstone
(C) hay's (D)wagner ground bridge

30.Medium resistances in the range from [ ]
(A)1Ω to 0.1MΩ (B) 1Ω to 0.5 MΩ
(C) 1Ω to 0.1kΩ (D) 1.Ω to 0.01MΩ

31.For series Rx-Cx circuit the Dissipation factor is given by [ ]
(A)ωCxRx (B)ωCx/Rx

(C) ω(Cx+Rx) (D)ω√CxRx

32.The sensitivity of wheatstone bridge is given by _____ [ ]

(A) Deflection/Current (B) Deflection X current

(C) Deflection-current (D)none

33.Examples of high resistances are ____.. [ ]

(A)armature resistance (B)ammeter shunt

(C) insulation (D) lamp filament

34.AnAC bridge is said to be balanced when _____ flows through the galvanometer. [ ]

(A)zero current (B) equal currents

(C) max current (D) none

35.The balance condition of an (((A)C bridge is _____. [ ]

(A) Z1Z2=Z3Z4 (B) Z1Z4=Z2Z3

(C) Z1Z3=Z2Z4 (D)Z1Z4=Z2/Z3

36. A _ in its simplest form consists of network of 4 resistive arms forming a closed circuit.[ ]

(A)Bridge circuit (B) inductive circuit

(C) capacitive circuit (D) none

37. All the resistances from 1 ohm and upto 0.1 Mohm are classified as [ ]

(A)low resistance (B) medium resistance

(C) high resistance (D) unknown

38. Capacitance can be calculated with _____bridge. [ ]

(A) Anderson bridge (B) de sauty bridge

(C) hay's bridge (D)Wein bridge

39. The wien bridge is used for the measurement of _____. [ ]

(A)capacitance (B) inductance

(C) frequency (D) resistance

40. If four impedances are Zab= 400L50 Zad= 200L40 , Zbc= 800L-50 and Zcd= 400L20 , then the bridge is said to be ____

[ ]

(A) Balanced (B) unbalanced

(C) under balanced (D) over balance

UNIT-III

MEASUREMENT OF POWER AND ENERGY

1. The frequency range of moving iron instruments is [ ]
   (A)audio frequencyband 20HZ to 20 KHZ (B) Very low frequencyband 10HZ to 30 KHZ
   (C) low frequencyband 30HZ to 300 KHZ (D)Power frequency 0 to 125 HZ
2. Thepowerina3-φ four wire circuit can be measured by using [ ]
   (A) 2 wattmeter (B)4 wattmeter
   (C) 3 wattmeter (D) 1 wattmeter
3. Phantom loading for testing of energy meters is used [ ]
   (A) to isolate the current & potential circuits
   (B) to reduce power loss duringtesting
   (C) For meters have low current rating
   (D) To test meters having a large current rating forwhich loads may not be available in laboratory. This also reduces power losses during testing.
4. Thepowerina3-φ four wire circuit can be measured by using [ ]
   (A) 2 wattmeter (B)4 wattmeter
   (C) 3 wattmeter (D) 1 wattmeter
5. Potential transformers are used in [ ]
   (A) A C current measurement (B) A C voltage measurement
   (C) D C current measurement (D)D C voltage measurement
6. Various adjustments in an energy meter include [ ]
   (A) light load or friction (B) lag and creep
   (C) overload and voltage compensation (D) all of the above
7. The power of a n-phase circuit can be measured by using a minimum of [ ]
   (A) (n - 1) wattmeter elements (B) n wattmeter elements
   (C) (n + 1) wattmeter elements (D) 2n wattmeter elements
8. Average power over a cycle is given by [ ]
   (A) VI cosϕ (B) VI
   (C) VI sin ϕ (D) I^2 R
9. The instantaneous torque in the electrodynamometer watt meter is given by [ ]
   (A) $i_1^2\left(\frac{d\mu}{d\theta}\right)$ (B) $i_1\ i_2\left(\frac{d\mu}{d\theta}\right)$
   (C) $i_1\ i_2\left(\frac{\mu}{\theta}\right)$ (D) $i_1^2\ i_2^2\left(\frac{d\mu}{d\theta}\right)$
10. In electrodynamometer wattmeter, moving coil is the….. [ ]
   (A) Pressure coil (B) current coil
   (C) fixed coil (D) none
11. The control technique used in wattmeter is [ ]
   (A) Spring control (B) gravity control
   (C) air control (D) any of above
12. Compensation for inductance of a pressure coil is done by [ ]
   (A) A parallel capacitance (B) a series capacitance
   (C) Shunt inductance (D) shunt conductance
13. The number of revolutions made per kilowatt hour [ ]
   (A) Energy constant (B) meter constant
   (C) power constant (D) torque constant
14. Slow revolutions are made by the disc under no load is known as [ ]

(A) Creeping (B) integrating
(C) braking (D) none

15. How many number of measuring elements required for measuring total Electrical energy in a n conductor system [ ]
(A) n (B) n – 2
(C) 2 n (D) n - 1

16. Shading bands are used for [ ]
(A) Reduce creeping (B) friction compensation
(C) Light load compensation (D) quadrature adjustment

17. Which one is most commonly used energy meters [ ]
(A) Induction type (B) mercury motor type
(C) commutator meter type (D) none

18. The meter used for measuring electrical power is called [ ]
(A) kwh meter (B) voltmeter
(C) ammeter (D) wattmeter

19. In dynamometer type of wattmeter, which coil is split up in to two parts [ ]
(A) pressure coil (B) current coil
(C) pressure coil and current coil both (D) none

20. The meter constant of energy meter is given by [ ]
(A) rev/kw (B) rev/kwh
(C) rev/watt (D) rev/wh

21. The speed of energy meter can be controlled by [ ]
(A) series magnet (B) braking magnet
(C) shunt magnet (D) shading band

22. The creeping error in single phase energy meter can be minimized by [ ]
(A) adjusting braking magnet
(B) use of short circuited loops on the outer limb of the shunt Magnet
(C) drilling two holes in the disc on the opposite sides of the spindle
(D) adjusting the shading band

23.Wattmeter cannot be designed on the principle of [ ]
(A)electrostatic instrument (B)thermocouple instrument
(C)moving iron instrument (D)electrodynamic instrument

24.In an energymeter braking torque is produced to [ ]
(A)safeguard it against creep (B)brake the instrument
(C)bring energy meter to stand still (D)maintain steady speed and equal to driving torque

25.The power of a n-phase circuit can be measured by usingaminimum of [ ]
(A)(n - 1) wattmeter elements (B)n wattmeter elements
(C)(n + 1) wattmeter elements (D)2n wattmeter elements

26.Two holes in the disc of energymeter are drilled at the opposite sides of the spindle to [ ]
(A)improve its ventilation (B)eliminate creeping at no load
(C)increase its deflecting torque (D)increase its brakingtcrque

27. A Dynamometer type wattmeter responds to the : [ ]
(A) Average value of the active power (B) Average value of the reactive power
(C) Peak value of the active power (D) Peak value of the reactive power

28. 4. Voltmeter should be of very high resistance so that: [ ]
(A) Its range is high (B) Its accuracy is high
(C) It may draw current minimum possible (D) Its sensitivity is high

29. The internal resistance for milli ammeter must be very low for: [ ]
(A)High sensitivity (B) High accuracy

(C) Maximum voltage drop across the meter (D) Minimum voltage drop across the meter

30. For an instrument the degree of repeatability or reproducibility in measurements is an alternative way of expressing its [ ]

(A)Precision (B) Accuracy
(C) Sensitivity (D) Linearity

31.The sensitivity of a measurement is a measure of [ ]

(A) Change in instrument output when the quantity being measured changes by a given amount
(B) Closeness of output readings for the same input when there are changes in the method of measurement
(C) Ratio of output to the input
(D) Closeness of output reading of instrument to the true value

32. In a ramp type DVM, the multivibrator determines the rate at which the [ ]

(A) Clock pulses are generated (B) Measurement cycles are initiated
(C) It oscillates (D) Its amplitude varies

33. In potentiometric type DVM, the adjustment of sliding contact is done by [ ]

(A) A single phase servomotor (B) Two phase servomotor
(C) Three phase servomotor (D) All of these

34. A dynamometer wattmeter is connected in ac circuit. The measured power is [ ]

(A) Rms power (B) average power
(C) Peak power (D) Instantaneous power

35. In two wattmeter method of 3 phase power measurement, when does one wattmeter read negative [ ]

(A) when power factor is less than 0.5 lagging
(B) when power factor is greater than 0.5 lagging
(C) when power factor is less than 0.5
(D) when power factor is unity

36. The household energy meter is [ ]

(A) an indicating instrument (B) a recording instrument
(C) an integrating instrument (D) none of the above

37.. In a low power factor wattmeter the pressure coil is connected [ ]

(A) to the supply side of the current coil (B) to the load side of the current coil
(C) in any of the two meters at connection (D) none of the above

38. In a low power factor wattmeter the compensating coil is connected [ ]

(A) in series with current coil (B) in parallel with current coil
(C) in series with pressure coil (D) in parallel with pressure coil

39. In a 3-phase power measurement by two wattmeter method, both the watt meters had identical readings. The power factor of the load was [ ]

(A) unity (B) 0.8 lagging
(C) 0.8 leading (D) zero

40. In a 3-phase power measurement by two wattmeter method the reading of one of the wattmeter was zero. The power factor of the load must be [ ]

(A) unity (B) 0.5
(C) 0.3 (D) zero

UNIT-IV

INSTRUMENT TRANSFORMERS & POTENTIOMETER

1. A potentiometer uses _____ during the process of standardization. [ ]
   (A)Weston standard cell (B) 10V cell
   (C) nokia cell (D) big battery
2. In ((A)C potentiometers the basic requirement is that both the voltages being measured must be equalwith respect to _____. [ ]
   (A)magnitude (B) phase angle
   (C) both a and b (D) frequency
3. If the magnitude and phase angle of an unknown voltage are measured on different scales ,then it is called _____ potentiometer. [ ]
   (A) Polar type AC potentiometer (B) coordinate type AC potentiometer
   (C) AC-DC potentiometer (D) DC potentiometer
4. The process of adjusting the working current supplied by the battery such that the voltage drop across a portion of sliding wire matches with the standard reference source is called [ ]
   (A) magnetization (B) standardization
   (C) measurement (D) range
5. A (D)C Potentiometer can be used for measuring [ ]
   (A) resistance (B) frequency
   (C) inductance (D) capacitance

6. If the inphase component and quadrature component are given by Va and Vb , then the magnitude of an unknown voltage is given by _____ [ ]
   (A) V=√Va2+Vb2 (B) v= √Va2-Vb2
   (C) √Va2xVb2 (D) √Va2/Vb2
7. After standardizing, the position of the rheostat, R in the battery circuit [ ]
   (A) should not be changed (B) should be changed
   (C) kept in maximum position (D) kept in minimum position
8. Voltbox is basically a device used for [ ]
   (A) extending the voltage range of the potenetiometer
   (B) measuring the current
   (C) measuring the voltage
   (D) measuring the power
9. Instrument transformers are [ ]
   (A) potential transformers (B) current transformers
   (C) both ((A) and ((B) (D) power transformers
10. Standardization of potentiometer is done in order that , they become [ ]
    (A) Accurate and Direct reading (B) accurate
    (C) Precise (D) accurate and precise
11. A potentiometer may be used for [ ]
    (A) Measurement of resistance (B) Measurement of current
    (C) calibration of ammeter (D) All
12. In order to achieve high accuracy, the slide wire of a potentiometer should be [ ]
    (A) as long as possible (B) as short as possible
    (C) Neither a or b (D) Thick.
13. Potential transformers are used in [ ]
    (A) A C current measurement (B) A C voltage measurement

(C) D C current measurement (D) D C voltage measurement

14. Turns compensation is used in CT's primarily for reduction of [ ]
(A) Phase angle error (B) Both ratio & phase angle errors
(C) ratio error, reduction in phase angle error is incidental (D) None of above

15. The burden of CT's is expressed in terms of _____ [ ]
(A) secondary winding current (B) VA rating of Transformer
(C) V, I , Pf of secondary winding circuit (D) None of above

16. What are the applications of potentio meter? [ ]
(A) Calibration of volt meter (B) Calibration of ammeter
(C) Measurement of resistance (D) all the above

17. What is the phase angle between the windings of a phase shifter? [ ]
(A) 180° (B) 90° (C) 270° (D) 0°

18. If E s =standard cell voltage, Ls = length taken for standard cell voltage, L ac = Length taken for unknown e.m.f , what is unknown voltage? [ ]
(A) $\frac{Es}{Lac} \times$Ls (B) $\frac{Es}{Ls}$
(C) $\frac{Es}{Ls} \times$ Lac (D) Es$\times$ Lac

19. If Potentiometer reading is V_R , standard cell voltage and resistance are Vs and S . What is the unknown resistance? [ ]
(A) $\frac{V_R}{Vs} \times$ S (B) $\frac{Vs}{V_R} \times$S
(C) $\frac{Vs}{S}$ (D) none

20. The accuracy of the potentio meter depends on [ ]
(A) standard cell (B) deflection
(C) both two (D)none

21. Potentiometer is basically a …… [ ]
(A) Comparison instrument (B) integrating instrument
(C) Calibrating instrument (D) indicating instrument

22. The operating principle of potentiometer is based on …… [ ]
(A) Magnetic effect (B) heating effect
(C) electromagnetic induction (D) None of the above

23. The emf of Weston standard cell is measured using ……. [ ]
(A) Potentiometer method (B) digital volt-meter
(C) moving coil meter (D) Moving iron meter

24. Hot wore instruments are used to measure ……. [ ]
(A) Voltage (B) pressure (C) temperature (D) length

25. The principle of working Q meter is …….. [ ]
(A) Self-inductance (B) mutual inductance
(C) parallel resonance circuit (D) Series resonance circuit

26. The secondary of CT is never left open circuited because otherwise [ ]
(A) heat dissipation in the core will be very large
(B) the core will be saturated and permanently magnetized rendering it useless
(C) dangerously high emfs will be induced in the secondary
(D) all the above

27. High ac voltages are usually measured with [ ]
(A) magnetic voltmeter (B) inductive voltmeter
(C) potential transformers with voltmeters (D) current transformers with voltmeters

28. The secondary of CT is never left open circuited because otherwise [ ]
(A) heat dissipation in the core will be very large
(B) the core will be saturated and permanently magnetized rendering it useless
(C) dangerously high emfs will be induced in the secondary
(D) all the above

29. A P.T is basically a [ ]
(A) Step-up voltage transformer (B) Step-down voltage transformer
(C) Auto transformer (D) Wattmeter

30. The no of turns on the primary of current transformer is usually [ ]
(A) 1 to 5 (B) 10 to 20
(C) 20 to 100 (D) 100 to 500

31. High ac voltages are usually measured with [ ]
(A) magnetic voltmeter (B) inductive voltmeter
(C) potential transformers with voltmeters (D) current transformers with voltmeters

32. The no of turns on the primary of current transformer is usually [ ]
(A) 1 to 5 (B) 10 to 20
(C) 20 to 100 (D) 100 to 500

33. It is required to measure the true open circuit e.m.f. of a battery. The best device is [ ]
(A) DC voltmeter (B) Ammeter and a known resistance
(C) DC potentiometer (D) None of the above

34. A voltage of about 200 V can be measured [ ]
(A) directly by a DC potentiometer
(B) a DC potentiometer in conjunction with a volt ratio box
(C) a DC potentiometer in conjunction with a known resistance
(D) none of the above

35. A direct current can be measured by [ ]
(A) a DC potentiometer directly
(B) a DC potentiometer in conjunction with a standard resistance
(C) a DC potentiometer in conjunction with a volt ratio box
(D) none of the above

36. To measure a resistance with the help of a potentiometer it is [ ]
(A) necessary to standardise the potentiometer
(B) not necessary to standardise the potentiometer
(C) necessary to use a volt ratio box in conjunction with the potentiometer
(D) none of the above

37. Basically a potentiometer is a device for [ ]
(A) comparing two voltages (B) measuring a current
(C) comparing two currents (D) none of the above

38. In order to achieve high accuracy, the slide wire of a potentiometer should be [ ]
(A) as long as possible (B) as short as possible
(C) neither too small not too large (D) very thick

39. To measure AC voltage by using an AC potentiometer, it is desirable that the supply for the potentiometer in taken [ ]
(A) from a source which is not the same as the unknown voltage
(B) from a battery
(C) from the same source as the unknown voltage
(D) any of the above

40. A potentiometer may be used for [ ]
(A) measurement of resistance (B) measurement of current
(C) calibration of ammeter (D) all of the above

UNIT - 5
MAGNETIC MEASUREMENTS

1. The measurement of various properties of magnetic materials are called [ ]
   (A) Magnetic measurements (B) electrical measurements
   (C) Magnetization (D) induction
2. The deflection of ballistic galvanometer is proportional to [ ]
   (A) Charge (B) voltage
   (C) current (D) damping
3. In a ballistic galvanometer, the deflecting torque is proportional to [ ]
   (A)Sine of the measurand (B) The current through the coil
   (C) Square of current through the coil (D) square root of current through the coil
4. In a flux meter [ ]
   (A) There is no controlling torque (B) The controlling torque is produced by springs
   (C) control weights are attached to moving coil(D) none
5. The equation of motion of galvanometer at any instant is given by [ ]
   (A) $Tj = Td + Tc + T_D$ (B)$Tj+T_D = Td +T c$
   (C) $T_D +Tj + T c = T d$ (D)$Tc+ T_D =Tj +T d$
6. For moving system of galvanometer, the torque trying to accelerate the system is [ ]
   (A) Damping torque (B) deflecting torque
   (C) controlling torque (D) inertia torque
7. For the moving system of galvanometer, the torque trying to retard the system is [ ]
   (A)damping torque (B)deflecting torque
   (C)controlling torque (D)all the above
8. Which of the following more accurate [ ]
   (A) Flux meter (B)Ballastic galvano meter
   (C)A and B (D)None
9. The instrument used to measure frequency in wave guides is [ ]
   (A)galvanometer (B)bolometer
   (C)klystron (D)cavity resonator
10. Which of the following instruments have the highest input impedance [ ]
   (A) Ohmmeter (B) VOM
   (C) VTVM (D) FETVM
11. The flux density is given by [ ]
   (A) $B=RK\theta/2NA$ (B) RK/2N
   (C) $RK\theta/NA$ (D) RK/4A
12. Flux density is expressed in [ ]
   (A)Volts/m^2 (B)current/m^2
   (C) Wb/m^2 (D) power/m^2
13. A sensitive galvanometer produces large deflection for a [ ]
   (A) small value of current (B) large value of current
   (C) large value of power (D) large value of voltage
14. The deflection of Ballistic Galvanometer is proportional to [ ]
   (A) Current (B) Voltage
   (C) Power (D) Charge
15. The signal generator is called as [ ]
   (A)Modulator (B) Demodulator
   (C)Detector (D)Oscillator

16. A_____device prevents the oscillation of the moving system and enables the latter to reach its final position quickly [ ]
(A)deflecting (B)controlling
(C)damping (D)any of the above

17. Damping of the Ballistic galvanometer is made small to [ ]
(A)get first deflection large (B)make the system oscillatory
(C)make the system critically damped (D)get minimum overshoot

18. Most sensitive galvanometer is [ ]
(A)elastic galvanometer (B)vibration galvanometer
(C)spot ballistic galvanometer (D) All

19. The ballistic galvanometer is usually lightly damped so that: [ ]
(A) It may oscillate (B) It may remain stable
(C) Amplitude of the first swing is large (D) Amplitude of the first swing is small

20. B-H Curve is used to determination of: [ ]
(A) Hysteresis loss (B) Iron loss
(C) Eddy current loss (D) Both (A) and (B)

21. Magnetic materials can be tested by: [ ]
(A) Self-inductance bridge (B) Cambell's mutual inductance bridge
(C) AC potentiometer (D) All the above

22. A PMMC instrument can be used as a flux meter by: [ ]
(A) Using low resistance shunt (B) Removing the control spring
(C) Making the control springs of large moment of inertia (D) Using a high series resistance

23. Open circuit fault in a cable can be located by: [ ]
(A) Blavier's test (B) Capacity test
(C) Varley loop test (D) Murray loop test

24. A ballistic galvanometer is used to measure: [ ]
(A) Charge (B) Current
(C) Voltage (D) Frequency

25. ____ factor is the ratio of total flux to the useful flux in a magnetic circuit: [ ]
(A) Form factor (B) Leakage
(C) Utility (D) Dispersion

26. Ballistic tests are used in magnetic measurements for [ ]
(A) Determination of flux density in specimen
(B) Determination of hysteresis loop of a specimen
(C) Determination of B-H curve of a specimen
(D) All the above

27. Two helical springs are used in a 'D' Arsonoval meter movement because [ ]
(A) It compensates for temperature changes (B) it improves damping
(C) It improves torque to weight ratio (D) it controls the deflecting torque effectively

28. Which of the set of torques is provided in deflection galvanometer: [ ]
(A) Deflection and controlling (B) Controlling and damping
(C) Deflecting and damping (D) Deflecting, controlling and damping

29. Damping of the Ballistic galvanometer is made small to [ ]
(A) get first deflection large (B) make the system oscillatory
(C) make the system critically damped (D) get minimum overshoot

30. If an instrument has cramped scale for larger values, then it follows [ ]
(A) square law (B) logarithmic law
(C) uniform law (D) none of the above

31. Which of the following is measured by using a vector voltmeter ? [ ]
(A) Amplifier gain and phase shift (B) Filler transfer functions
(C) Complex insersion loss (D) All of the above
32. The _____ section of CRT provides sharply focused electron beams [ ]
(A) Cathode (B) Anode
(C) Fluorescent Screen (D) Electron gun.
33. The instrument efficiency is defined as: [ ]
(A) The ability of the instrument to read the smallest input changes
(B) The ratio of the measured quantity at full -scale to the power taken by the instrument
(C) The ratio of the change in output signal to the change in input signal
(D) The ability of the system to reproduce the output in the same form as the input
34. Which of the following is a null detection device? [ ]
(A) Ballistic galvanometer (B) D'Arsonval galvanometer
(C) Potentiometer (D) Ammeter.
35.All the components of the CRT are enclosed in an evacuated glass tube called __ [ ]
(A)Base (B) Gun
(C) Deflection system (D) envelope.
36. DVM is the abbreviation for: [ ]
(A) Digital vacuum meter (B) Digital volume meter
(C) Digital voltmeter (D) Divider voltage meter
37. Siemens is a unitformeasuring [ ]
(A) Conductance (B) Resistance
(C) Flux density (D) Electric field
38. A general thermocouple instrument cannot be described with the feature of [ ]
(A) High sensitivity (B) Absence of frequency errors
(C) Dependence on ambient temperatures (D) Small power loss.
39. _____ is the heart of CRO. [ ]
(A) Vertical plates (B) Base
(C) CRT (D) Electron gun
40. The _____ section of CRT provides sharply focused electron beams [ ]
(A) Cathode (B) Anode
(C) Fluorescent Screen (D) Electron gun.

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