



43209

Library
Brainware University
398, Ramkrishnapur Road, Barasat
Kolkata, West Bengal-700125



BRAINWARE UNIVERSITY

Term End Examination 2025-2026

Programme – Dip.EE-2024

Course Name – Electrical Measuring Instrument

Course Code - DEE40113

(Semester IV)

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) Tell that a null-type instrument, as compared to a deflection-type instrument, has
 - a) a lower sensitivity
 - b) a faster response
 - c) a higher accuracy
 - d) all of these
- (ii) The measurement of a quantity defined as
 - a) an act of comparison of an unknown quantity with a predefined acceptable standard which is accurately known
 - b) an act of comparison of an unknown quantity with another quantity
 - c) an act of comparison of an unknown quantity with a known quantity whose accuracy may be known or may not be known
 - d) none of these
- (iii) Select the following desirable static characteristics in the measurement system.
 - a) Sensitivity
 - b) Accuracy
 - c) Reproducibility
 - d) All of these
- (iv) Indicate the smallest change in a measured variable to which an instrument will respond.
 - a) resolution
 - b) precision
 - c) sensitivity
 - d) accuracy
- (v) Indicate the working principle of an analog multimeter.
 - a) An analog multimeter uses a microprocessor to measure the electrical quantity
 - b) An analog multimeter uses a moving coil meter to measure the electrical quantity.
 - c) An analog multimeter uses a voltage comparator to measure the electrical quantity.
 - d) An analog multimeter uses a digital-to-analog converter to measure the electrical quantity.
- (vi) Identify the purpose of a potential transformer (PT).

- a) To measure high voltages
c) To measure low voltages
- (vii) Recognize a clip-on ammeter.
a) An instrument used for measuring the voltage of an electrical circuit
c) An instrument used for measuring the resistance of an electrical circuit
- (viii) Identify the measurement of inductance using Maxwell's bridge.
a) high Q factors
c) medium Q factors
- (ix) Identify the correct option: The advantage of Anderson's bridge over Maxwell's bridge is that _____.
a) its final balance equations are independent of inductor losses
c) number of bridge components required are less
- (x) Predict the AC bridge, which can measure frequency.
a) Anderson's bridge
c) De Sauty's bridge
- (xi) Select the correct reason from the following options: Energy meters do not have a control spring to _____.
a) avoid unnecessary friction losses
c) avoid damping during movement
- (xii) Identify the main advantage of induction-type energy meters.
a) ratio of torque and weight is low
c) high and sustained accuracy
- (xiii) Choose the number of the fixed coil is split into the dynamometer-type wattmeter.
a) 4
c) 2
- (xiv) Identify the type of pressure coil of a wattmeter.
a) has capacitance and inductance
c) has resistance and capacitance
- (xv) Indicate controlling torque produced in a meggar.
a) control springs
c) control coil
- b) To measure high currents
d) To measure low currents
- b) An instrument used for measuring the current of an electrical circuit
d) An instrument used for measuring the power of an electrical circuit
- b) very low Q factors
d) wide range of Q factor variations
- b) it reduces cost by not making capacitor or inductor as the variable parameters
d) attaining balance condition is easier and less time consuming
- b) Maxwell's bridge
d) Wien's bridge
- b) enable continuous rotation of the disc
d) all of these
- b) low friction
d) all of these
- b) 3
d) 1
- b) has inductance and resistance
d) has only inductance
- b) balance weights
d) all of these

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Differentiate between accuracy and precision. (3)
3. Describe the advantages and disadvantages of 3-phase power measurement by the two wattmeter method. (3)
4. Explain the reason "the scale of a moving iron instrument is not uniform". (3)
5. A wattmeter reads 25.34 watt. The absolute error in the measurement is -0.11 watt. Calculate the true value of power. (3)
6. Two wattmeters are connected to measure the power consumed by a 3-phase load with a power factor of 0.4. The total power consumed by the load as indicated by the two wattmeter is 30 kW. Evaluate the readings of the individual wattmeter. (3)

OR

In a 3-phase circuit two wattmeters used to measure power indicate 1200 W and 600 W respectively. Evaluate the power factor of the circuit: (a) when both wattmeter readings are positive, (b) when the latter is obtained by reversing the current coil connection. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Explain the working of PMMC type instruments. (5)
8. Two wattmeters connected to measure the input to a balanced three-phase circuit indicate 2000 W and 500 W, respectively. Calculate the power factor of the circuit. (5)
9. Develop the general equations for balance in ac bridges. (5)
10. Explain with a proper diagram the spring-control controlling torque of an instrument. (5)
11. The expected value of the voltage across a resistor is 80 V. However, the measurement gives a value of 79 V. Calculate (a) absolute error, (b) percentage error, (c) relative accuracy, and (d) percentage of accuracy. (5)
12. The constant of a 230 V, 50 Hz single-phase energy meter is 185 revolutions per kWh. The meter takes 190 second for 10 revolutions while supplying a non-inductive load of 4.5 A at normal voltage. Calculate the percentage error of the instrument. (5)

OR

A DC ampere-hour meter is rated at 5 A, 250 V. The declared constant is 5 A-sec./rev. Evaluate the constant in revolutions per kWh. Also, calculate the full-load speed of the meter. (5)

Library
Brainware University
398, Ramkrishnapur Road, Barasat
Kolkata, West Bengal-700125