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Barasat, Kolkata - 700125

Term End Examination 2023
Programme – Dip.EE-2018/Dip.EE-2019/Dip.EE-2021
Course Name – Electrical Measuring Instrument
Course Code - DEE402
(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) What is 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.
- (ii) Which of the following is true about a three-phase power factor meter?
 - a) It measures the power factor of a three-phase circuit only
 - b) It uses a dynamometer to measure the power factor
 - c) It is only suitable for measuring small loads
 - d) All of the above
- (iii) In Maxwell's inductance bridge, which of the following is varied to balance the bridge?
 - a) Resistance
 - b) Inductance
 - c) Capacitance
 - d) Frequency
- (iv) Identify why a purely mechanical instruments cannot be used for dynamic measurements because they have
 - a) large time constant
 - b) higher response time
 - c) high inertia
 - d) all of the above
- (v) Select the main advantage of the null balance technique of measurement is that
 - a) it gives a quick measurement
 - b) it does not load the medium
 - c) it gives a center zero value at its input
 - d) it is not affected by temperature variation
- (vi) In which of the following conditions Earth Resistance measurement is not possible?
 - a) Dry weather
 - b) Moisture content in the soil is high
 - c) Soil is sandy
 - d) None of the above
- (vii) What is the formula for calculating power?
 - a) Power = Work x Time
 - b) Power = Energy x Time
 - c) Power = Force x Distance
 - d) Power = Voltage x Current

(viii) Choose the principle of operation of a digital multimeter.

- a) It uses a moving-coil or moving-iron meter to measure current or voltage
- b) It uses a microcontroller and an analog-to-digital converter to measure current, voltage, and resistance
- c) It uses a thermocouple to measure temperature
- d) It uses a pressure sensor to measure pressure

(ix) Which of the following is a common unit for expressing the power output of engines?

- a) Watt (W)
- b) Newton (N)
- c) Horsepower (hp)
- d) Joule (J)

(x) Explain the purpose of a calibration procedure for a meter

- a) To adjust the meter to the correct range and resolution
- b) To check the accuracy and linearity of the meter
- c) To verify the meter's compliance with international standards
- d) All of the above

(xi) Which of the following is a measure of the rate at which work is done?

- a) Energy
- b) Voltage
- c) Current
- d) Power

(xii) Identify the quantities represents the power in an AC circuit.

- a) Current
- b) Voltage .
- c) Resistance
- d) Wattage .

(xiii) Predict the relationship between power factor and efficiency.

- a) Directly proportional
- b) Inversely Proportional
- c) Undefined
- d) No relationship

(xiv) An electro-dynamometer type of instrument finds its major use as

- a) standard instrument only
- b) both as standard and transfer instrument
- c) transfer instrument only
- d) indicator-type instrument

(xv) Select which of the following instruments is commonly used to measure low resistances.

- a) Kelvin Double bridge
- b) Wheatstone bridge
- c) Megger
- d) All of the above

Group-B

(Short Answer Type Questions)

3 x 5=15

- 2. Define random errors and explain how they are analysed statistically. (3)
- 3. Explain the applications of Wheatstone bridge. (3)
- 4. Differentiate between accuracy and precision. (3)
- 5. Discuss the advantages and disadvantages of Maxwell's bridge for measurement of unknown inductance. (3)
- 6. How to select an ammeter? (3)

OR

Explain the working of PMMC type instruments. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

- 7. Two wattmeters connected to measure the input to a balance three phase circuit indicate 2000watt and 500watt respectively . Calculate the power factor of the circuit . (5)
- 8. How is current transformer used in current measurement? (5)
- 9. Develop the block diagram of digital multimeter. (5)
- 10. Evaluate the features of a digital multimeter. (5)
- 11. Define accuracy, precision, resolution with example. (5)

12. Describe the construction of PMMC type instruments with neat diagram.

OR

Describe the construction of wattmeter with neat diagram.

(5)

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