BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – B.Tech.(EE)]-2021/B.Tech.(EE)-2023
Course Name – Electrical and Electronics Measurement
Course Code - PCC-EE403
(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) Identify the purpose of a surge protector.

a) To prevent overloading of an electrical circuit
b) To detect when there is a ground fault in an electrical circuit and interrupt the current flow
c) To regulate the voltage in an electrical circuit
d) To protect electronic devices from voltage spikes and surges

(ii) Predict the relationship between power factor and efficiency is

a) Directly proportional
b) Inversly Proportional
c) Undefined
d) No relationship

(iii) Identify the purpose of the moving iron core in a dynamometer type wattmeter.

a) To generate an electromagnetic field
b) To provide a reference for the measurement
c) To measure the current
d) To measure the voltage

(iv) Identify 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.

(v) Select from the following the correct equation for the unknown capacitance Cx in terms of the known capacitances C1 and C2 and the resistance R is

a) Cx = C1C2/R
b) Cx = C1R/C2
c) Cx = C2R/C1
d) Cx = C1C2R

(vi) Select from the following which is the example of digital Earth Tester.

a) Megger
b) Fluke

c) Simpson d) Both

(vii) Select the correct option: CRO is a _____.

a) fast x-y plotter b) slow x-y plotter
c) medium x-y plotter d) not a plotter

(viii) Choose that a CRO is used to check _____

a) op amps b) resistors
c) voltage d) capacitance, inductance and diodes

(ix) Calculate the multiplier resistance required to extend the range of a 100V voltmeter to 1000V, if the meter resistance is 1000 ohms.

a) 9000 ohms. b) 10000 ohms.
c) 11000 ohms. d) 900 ohms.

(x) Solve for the percentage error if a 50V measurement has an error of 1V.

a) 2%. b) 1%.
c) 3%. d) 4%.

(xi) Identify the instrument used to measure electrical current.

a) Voltmeter b) Ammeter
c) Wattmeter d) Energy meter

(xii) Indicate the difference between accuracy and precision.

a) Accuracy is closeness, precision is repeatability b) Both are the same
c) Precision is better than accuracy d) Neither is important

(xiii) Indicate the advantage of using instrument transformers.

a) Low cost b) Increases accuracy
c) Allows safe measurements d) Reduces range

(xiv) Select from the following option which is correct for wattmeter.

a) Measures current b) Measures voltage
c) Measures power d) Measures resistance

(xv) Predict how errors in a wattmeter are minimized.

a) Using compensation coils b) Reducing load
c) Increasing current d) Reducing voltage

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Define accuracy in measurement and explain its importance. (3)
3. Identify the conditions for bridge balance in Wheatstone Bridge. (3)
4. Describe the construction of an LVDT (Linear Variable Differential Transformer) with suitable diagram. (3)
5. Define the term Cathode Ray Oscilloscope (CRO) and state the purpose of CRT. (3)
6. Write the need for calibration in electrical measuring instruments. (3)

OR

Develop a procedure to determine the power factor using a digital wattmeter. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Explain the loading effect due to shunt and series connected instruments. (5)
8. Define the working principle of electrodynamometer type wattmeter with its internal parts. (5)
9. Define the term strain gauge and explain its applications. (5)
10. Compare the working principles of analog and digital oscilloscopes. (5)

11. Analyze the effect of lead and lag power factors on wattmeter readings in a 3-phase system. (5)

12. Justify the importance of digital multimeters over analog meters. (5)

OR

Summarize the method of measuring capacitance using Schering bridge. (5)

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