

Reg No :

Name :



MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM

(Govt. Aided Autonomous Institution)

Second Semester B.Tech. Degree Examination, May, 2026

Course Code: B24EE1T03

Course Name: ELECTRICAL MEASUREMENTS

Max. Marks: 100

Duration:3 Hours

PART - A: 30 Marks (10 Qns x 3 Marks)

Answer all questions

1. How does the deflecting force affect the movement of an instrument's needle or pointer?
2. Specify the role of a multiplier resistor in a moving iron voltmeter.
3. Why is it necessary to use instrument transformers for measurement in high-voltage or high-current systems?
4. Explain the principle of operation of an induction-type single-phase energy meter.
5. Construct a bridge circuit to measure the frequency in audio and high frequency oscillators.
6. Describe the loss of charge method for the measurement of insulation resistance.
7. Explain the relationship between the deflection angle and the quantity of charge in a Flux meter.
8. What are the principal requirements in magnetic measurement?
9. State any three disadvantages of digital instruments.
10. Explain the purpose of TOD meter.

PART - B: 70 Marks (5 Qns x 14 Marks)

Answer any One full question from each module

Module 1

11. a. Explain the main functional elements of a measurement system with example. (10 Marks)
- b. What are secondary instruments, and how do they assist in measurement? (4 Marks)

OR

12. a. With the help of a neat diagram explain the construction and working of a PMMC instrument. (10 marks)
- b. If a PMMC instrument has a coil of 100 turns, flux density of 0.15 Wb/m^2 , area of 80 mm^2 and current of 5mA , then what will be its deflecting torque? (4 marks)

Module 2

13. a. Conventional wattmeter, when used to measure power with low power factor value shows erroneous reading. Justify the statement. What are the modifications to be made to convert it into a low power factor (LPF) wattmeter. (8 Marks)
- b. How can reactive power (Q) be calculated in a single-phase AC circuit? (6 Marks)

OR

14. a. How do you measure power in a three-phase unbalanced system? (7 Marks)
- b. In a balanced three-phase system, the two wattmeters connected to the system give the following readings: $W_1=400 \text{ W}$, $W_2=200 \text{ W}$. Calculate the total power consumed by the system and the power factor of the system. (7 Marks)

Module 3

15. a. What are the advantages and limitations of using a Slide Wire Potentiometer for voltage measurement? (7 marks)
- b. Enumerate the steps involved in achieving balance and null deflection in the Crompton Potentiometer? (7 marks)

OR

16. a. Draw the diagram of the bridge used to measure low resistance and show that measurement of resistance using this bridge is independent of connecting lead resistance. (7 marks)
- b. How resistance is measured using Wheatstone bridge? Explain with a neat diagram. (7 marks)

Module 4

17. a. Explain how CRO can be used to measure frequency and phase angle. (7 Marks)
- b. With a neat diagram explain the working of Cathode Ray Tube. (7 Marks)

OR

18. a. How does a ballistic galvanometer measure the quantity of charge passing through it? (10 Marks)
- b. What are the limitations of Ballistic galvanometer? (4 Marks)

Module 5

19. a. With the help of a block diagram explain virtual instrumentation system. (7 Marks)
 b. Write a short note on proximity sensors. (7 Marks)

OR

20. a. Explain the operation of Clamp on meter with diagram, (8 Marks)
 b. State the advantages and disadvantages of digital multimeter. (6 Marks)
