

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S3 (S,FE) (FT/WP) (S1 PT) Examination May 2025 (2019 Scheme)

Course Code: EET203**Course Name: MEASUREMENTS AND INSTRUMENTATION**

Max. Marks: 100

Duration: 3 Hours

PART A*Answer all questions. Each question carries 3 marks*

Marks

- 1 Describe the different methods for producing control torque. (3)
- 2 Comment on the shape of scale of Moving coil instrument and explain the reason for the same. (3)
- 3 Compare induction type watt-hour meters with digital energy meters. (3)
- 4 Analyze the scenario of secondary open circuit in a current transformer. (3)
- 5 Explain the method of measurement of frequency using Wein's bridge. (3)
- 6 Describe the measurement of high dc voltage with Sphere gap. (3)
- 7 Explain the basic working principle of fluxmeter (3)
- 8 Compare the features of thermistors with resistance temperature detector(RTD). (3)
- 9 Describe the functionality of Sweep generator in a CRO. (3)
- 10 Explain the basic working principle of ultrasonic flow meter. (3)

PART B*Answer any one full question from each module. Each question carries 14 marks***Module 1**

- 11 a. Describe the essentials of indicating instruments. List and explain various methods to produce damping torque. (9)
- b. A voltmeter measures 100 V. The range of the voltmeter is 0-200 V and the guaranteed accuracy is 1% of the full scale reading. What is the range of true value of voltage? (5)
- 12 a. Derive the torque equation of a Moving iron instrument. (8)
- b. It is required to measure 1000 V with a PMMC voltmeter. The instrument gives a full scale deflection of 20 mA when the potential difference across its terminals is 200 mV. Find the value of series resistance required. (6)

Module 2

- 13 a. Prove that deflection of the pointer is proportional to power in a (9)

dynamometer type wattmeter. Use suitable diagrams and derivations

- b. The power consumed in a balanced 3 phase circuit is measured by two wattmeter method. The reading of one of the wattmeter is 1000W while the other wattmeter reads zero. Find the power factor of the system. (5)
- 14 Analyze why the turns ratio is not equal to transformation ratio in a current transformer. Explain with equivalent circuit, phasor diagram and mathematical derivation of transformation ratio. (14)

Module 3

- 15 a. Analyze whether the measurement of inductance using Maxwell's Inductance bridge is dependent on excitation frequency. Use neat circuit diagram and mathematical analysis. (8)
- b. Describe the method of calibration of ammeter using dc potentiometer. (6)
- 16 a. Describe any one method for the measurement of insulation resistance with suitable circuit diagram and mathematical equations. (8)
- b. Explain the basic working principle of hall effect sensors. (6)

Module 4

- 17 a. An industrial unit needs a highly accurate temperature monitoring system. The unit temperature varies from 20°C to 80°C. The available temperature transducers are RTD and thermistor. Identify the best suited transducer for this particular application and comment on the selection. (5)
- b. Describe the method of determination of iron loss with Lloyd Fisher square with the help of a neat circuit diagram. (9)
- 18 a. Describe the method of determination of BH curve using ballistic galvanometer with circuit diagram. (9)
- b. Illustrate the typical signal conditioning circuit used at the output of a basic thermocouple with suitable diagram. (5)

Module 5

- 19 a. Plot and explain the output characteristics (voltage and phase) of an LVDT. (8)
- b. Describe the basic components of a CRO with a block diagram. (6)
- 20 a. Explain strain gauge load cell- bridge configuration. (8)
- b. Describe the basic principle of PMU. (6)
