

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third Semester B.Tech Degree Regular and Supplementary Examination December 2022 (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 Define the following terms in measurement (3)
 - (a) Accuracy
 - (b) Precision
 - (c) Resolution
- 2 Explain three methods to provide deflecting torque in electrical instruments. (3)
- 3 List the advantages of smart energy meters over conventional energy meters. (3)
- 4 Explain the working principle of potential transformer with help of neat diagrams. (3)
- 5 Explain how insulation resistance can be measured using loss of charge method. (3)
- 6 Explain the concept of Hall Effect and its application in high DC current measurement. (3)
- 7 Explain the principle of operation of thermistor. (3)
- 8 Explain the working of resistance temperature detectors. (3)
- 9 Draw the diagram of a Cathode Ray Tube (3)
- 10 Describe the working of a Phasor Measurement Unit (PMU). (3)

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

- 11 (a) Explain two mechanisms for producing control torque in electrical measuring instruments with neat diagrams. (4)
- (b) With the help of neat diagrams, explain the construction of attraction type moving iron instrument. Prove that the deflecting torque in moving iron instrument is proportional to square of the current being measured. (10)

- 12 (a) Explain three mechanisms for producing damping torque in electrical measuring instruments with neat diagrams. (6)
- (b) Explain how the range of instrument can be extended in PMMC ammeter and voltmeter? (8)

Module 2

- 13 (a) With neat diagram, explain the construction and working of Dynamometer type wattmeter. (8)
- (b) Two wattmeters are connected to measure the power consumed by a 3-phase balanced load. One of the wattmeters read 1500 Watts and the other 700 Watts. Find power factor of the load, (6)
- (i) when both the readings are positive, and
- (ii) when the reading of the second wattmeter is obtained after reversing its current coil connection.
- 14 (a) Conventional wattmeter, when used to measure power with low power factor value shows erroneous reading. Justify the statement. (8)
- What are the modifications to be made to convert it into a low power factor (LPF) wattmeter?
- (b) With neat diagram, explain the construction and working of Induction type single phase energy meter. (6)

Module 3

- 15 (a) Explain how unknown self-inductance is measured using Maxwell's Inductance bridge with neat circuit diagram. Derive the expression for unknown self inductance. Draw the phasor diagram. (8)
- (b) Explain how high voltage measurement can be performed using Sphere Gaps. (6)
- 16 (a) Explain how unknown capacitance is measured using Schering Bridge with neat circuit diagram. Derive the expression for unknown capacitance. Draw the phasor diagram. (8)
- (b) With relevant diagrams, explain how earth resistance is measured using potential fall method. (6)

Module 4

- 17 (a) Explain wattmeter method of hysteresis loss measurement using Lloyd Fisher square. (8)
- (b) With the help of a neat diagram, explain the working principle of photovoltaic cells. (6)

- 18 (a) Explain the measurement of flux in a ring specimen using Flux meter. (8)
(b) Explain the working principle of photoconductive transducers with neat figure. (6)
List any two applications of photoconductive transducer.

Module 5

- 19 (a) Explain the construction and working of LVDT with neat diagrams. (8)
(b) Explain the principle of operation of general purpose CRO with the help of a block diagram. (6)
- 20 (a) With neat figures explain the working principle of Electromagnetic and ultrasonic flow meters (8)
(b) Draw and explain the block diagram of digital multimeter (6)
