Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIFTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 2019
Course Code: AE303
Course Name: ELECTRICAL MEASUREMENTS AND MEASURING INSTRUMENTS

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions, each carries 15 marks.
Marks

1 a) Define the term standards in measurement and explain the following terms with   (5)
        applications a) Absolute standards b) Working standards

   b) Explain loading effect.   (5)

        Prove that when a voltmeter is connected to a circuit, the measured   voltage is

        $$E_L = \frac{E_0}{1+\frac{Z_L}{Z_0}}$$

        Where E_0 is the voltage at no load, Z_0 is the output impedance, Z_L is the input

        impedance voltmeter. How we reduce the loading effect in voltmeter.

   c) Define accuracy, precision and resolution. Explain how they are related.   (5)

2 a) Explain shunts and multipliers in measuring instruments.   (7)

   b) Sketch and briefly describe the construction and working of an electrostatic type (8)
        instrument.

3 a) Explain different types of errors in measurement. Suppose a voltmeter measures   (8)
        10.00 V which is known to have ±0.2 V error, find the absolute and relative error.

   b) b) With neat sketch describe the working of any one type of galvanometer.   (7)

PART B
Answer any two full questions, each carries 15 marks.

4 a) Draw the circuit of a Wheatstone 's bridge and derive the balance equation for dc (8)
        bridge. Find also the expression for current through galvanometer for a small
        unbalance

	b)	Explain the working of a Carey foster slide wire bridge.	(7)
5	a)	Derive the equation for balance in Maxwell's inductance capacitance bridge and explain the limitations of Maxwell's inductance capacitance bridge.	(7)
	b)	) Describe the principle and working of a polar type potentiometer.	(8)
6	a)	Draw a neat diagram of Kelvin's double bridge. A Kelvin's double bridge is balanced with following constants. Outer arm ratio = 100Ω and 1000Ω , inner arm ratio = 99.92 Ω and 1000.6, Resistance of link = 0.1Ω , Standard resistance = 0.00377Ω. Calculate the value of unknown resistance.	(7)
	b)	Draw the diagram of a Vernier potentiometer and explain its working	(8)

PART C
Answer any two full questions,each carries 20 marks.

7	a)	Describe the working of a digital storage oscilloscope with block diagram	(8)
	b)	Explain the working of X-Y recorder.What is the difference between X- Y and strip chart recorders.	(7)
	c)	How frequency and phase of a signal measured using CRO	(5)
8	a)	Explain the working of spectrum analyzer and give its applications	(8)
	b)	Give note on different types of energy meters	(7)
	c)	Write note on true RMS meter	(5)
9	a)	With block diagram describe the working of a sampling oscilloscope	(10)
	b)	Explain the principle and working of a Q meter. Also outline the factors that cause errors during a Q measurement.	(10)

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