BTECH
(SEM-5) ELECTRONIC INSTRUMENTATION & MEASUREMENTS 2021-22

TIME:3 HOUR   *Total Marks: 100*

Instruction: Attempt the questions as per the given instructions. Assume missing data suitably.

SECTION - A	
Attempt *All Parts* in Brief	**2*10 = 20**

Q1	**Questions**	**Marks**
(a)	Three resistances have the following rating $R_1 = 25\Omega \pm 5\%$, $R_2 = 43 \Omega \pm 2\%$, $R_3 = 85\Omega \pm 5\%$. Determine the magnitude and limiting error in ohms if resistance is connected in series.	2
(b)	Define the systematic error with example.	2
(c)	Define the term resolution and significant figure.	2
(d)	What is mean by residual resistance and inductance in the Qmeter ?	2
(e)	What is mean by interpolation in oscilloscopes?	2
(f)	What a sensitivity of voltmeter?	2
(g)	Define the term data acquisition systems.	2
(h)	What are the factors influencing the choice of transducer?	2
(i)	Why calibration of a measuring instrument is important ?	2
(j)	What is the role of time base circuit in CRO ?	2

SECTION - B

Attempt _Any Three_ of the following   3*10 = 30

Q2	Questions	Marks
(a)	Explain the working principle of PMMC type equipment using torque equation.	10
(b)	Explain the dual slope integrator digital voltmeters system with proper diagram and waveform.	10
(c)	Derive the equation for Maxwell bridge and solve a Maxwell inductance bridge uses a standard capacitor C_3 = 0.1μF and operate at a supply frequency of 100 Hz. Balance is achieved when R_1 = 1.26 kΩ, R_3 = 470Ω, and R_4 = 500 Ω. Calculate the inductance and resistance of the measured inductor, and determine its Q factor.	10
(d)	Explain the working principle, block diagram and waveform of sampling oscilloscope.	10
(e)	Describe the Hall-effect transducers with their application.	10

SECTION - C

Attempt _Any One_ of the following   5*10 = 50

Q3	Questions	Marks
(a)	Draw and explain galvanometer with its proper application.	10
(b)	The following values were obtained from the measurements of the values of 41.7, 42.0, 41.8, 42.0, 42.1, 41.9, 42.0, 41.9, 42.5 and 41.8. Calculate i. The arithmetic mean ii. The standard deviation iii. The probable error of one reading. iv. The probable error of mean v. Range.	10

Q4	Questions	Marks
(a)	Explain the digital frequency meter system for forward counting using suitable block diagram.	10
(b)	Explain the working principle of AC electronics voltmeter circuits using proper circuit diagram.	10

Q5	Questions	Marks
(a)	Derive the balancing equation for parallel resistance capacitance bridge with proper circuit diagram.	10
(b)	What is Kelvin double bridge? Derive the balance equation for Kelvin double bridge.	10

Q6	Questions	Marks
(a)	Draw the block diagram and waveform of DS0 with its unique application.	10
(b)	Describe the working principle of CRT with their proper diagram.	10
Q7	**Questions**	**Marks**
(a)	How does an LVDT work? Explain the working principle of LVDT with its application.	10
(b)	Where are thermocouple used ? Explain various types of thermocouple in detail.	10