Roll No: | | | | | | | | | | | |

PRESIDENCY UNIVERSITY

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

Presidency University Act, 2013 of the Karnataka Act No. 41 of 2013 | Established under Section 2(f) of UGC Act, 1956
Approved by AICTE, New Delhi | Approved By BCI
Bengaluru

Mid Term Examinations - October 2026

Date: 07/10/2026 **Time:** 09:30 AM - 11:00 AM

Course Code: ECE3200 **Course Name:** Measuring Instruments and Sensors

Semester: Fifth Semester **Max. Marks:** 50 **Weightage:** 50%

CO - Levels	CO1	CO2	CO3
Marks	46	20	24

PART A: Answer Following Questions. 10 M

Q.N.	Questions	M	CO	BT
1	Discuss the difference between Scale Span and Scale range of an instrument.	2	CO1	BT2
2	Explain the equations for the standard deviation, when the number of samples are greater than 20 and also the number of samples are less than 20	2	CO1	BT2
3	Classify the methods of measurement with one example each?	2	CO1	BT2
4	Expalin the capacitance? Name any two AC bridges used to measure an unknown capacitance and state one practical reason for choosing one over the other.	2	CO3	BT2
5	List the classification of resistances based on their value, and name the different methods used to measure medium resistance.	2	CO3	BT1

PART B : Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
6	Classify the types of errors in measurement. Explain the systematic errors (observational, environmental and instrumental) and the methods used to reduce them.	10	CO2	BT2
7	A spring balance is calibrated in an environment at a temperature of 20°C and has the following deflection/load characteristic: | Load (kg) | 0 | 1 | 2 | 3 | | Deflection (mm) | 0 | 20 | 40 | 60 | It is then used in an environment at a temperature of **30°C**, and the following deflection/load characteristic is measured: | Load (kg). | 0 | 1 | 2 | 3 | | Deflection (mm) | 5 | 27 | 49 | 71 | Determine: 1. The sensitivity of the spring balance at each temperature. 2. The zero drift and sensitivity drift per °C change in ambient temperature. 3. The zero drift coefficient and sensitivity drift coefficient.	10	CO2	BT3

PART C: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT

8	A measuring system is designed to provide precise and dependable data about the physical value of a measured variable. a) Explain the various measurement methods and support each with an appropriate example. b) Describe the essential significance of measuring instruments with an example	10	CO1	BT2
9	Explain the static characteristics of measuring instruments: accuracy, precision, sensitivity, linearity, hysteresis, dead time, dead zone, and resolution.	10	CO1	BT2

PART D: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
10	Six students recorded their individual weight measurements as 68 kg, 72 kg, 70 kg, 69 kg, 71 kg, and 73 kg. Compute: (a) median (b) The deviations from the mean (c) The average deviation (d) The standard deviation (e) The variance	10	CO1	BT3
11	Suppose you are asked to measure a temperature and the following set of readings were obtained (in degree centigrade) using five different thermometers *T1, T2, T3, T4, T5* *T1* 35 34 33 36 35 33 36 34 33 33 *T2* 32 33 32 31 29 30 28 29 32 31 *T3* 33 34 32 34 26 28 33 27 31 33 *T4* 36 37 35 34 37 41 43 44 38 38 *T5* 32 31 31 30 29 30 29 29 31 31 Based on the given data, rank the thermometers based on their precisions and accuracies by filling the tabular column. You may consider the true value to be 30^{o}C. Rank → | Rank 1 | Rank 2 | Rank 3 | Rank 4 | Rank 5 Accuracy | | | | | | Precision | | | | | |	10	CO1	BT3

PART E: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
12	A Wheatstone bridge circuit is balanced with the following resistors: • R1=220ΩR_1 = 220\Omega • R2=330ΩR_2 = 330\Omega • R3=150ΩR_3 = 150\Omega • Rx=?R_x = ? **(a)** Draw the Wheatstone bridge circuit and determine the value of the unknown resistance RxR_x. **(b)** Identify the resistor colour code for the calculated value of RxR_x.	10	CO3	BT3
13	(A) Schering bridge is used to measure an unknown capacitance. At balance: the standard capacitor C2 = 1000 pF, the non-inductive resistor R3 = 1000 Ω, and arm 4 consists of R4 = 2000 Ω in parallel with C4 = 400 pF. The supply frequency is 1 kHz. Determine the unknown capacitance Cx, its equivalent series resistance Rx, and the dissipation factor D. [5M] (b) A Maxwell's Inductance–Capacitance Bridge is used to measure an unknown inductance. At balance: R2 = 4000 Ω, R3 = 2000 Ω, R4 = 5000 Ω, and the standard capacitor C4 = 0.5 μF. Determine the unknown inductance Lx and its resistance Rx. [5M]	10	CO3	BT3