UPES
UNIVERSITY OF TOMORROW

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2022

Course: IST for Civil Eng Applications **Semester: IV**
Program: B.Tech Civil (Infra Dev) **Time   : 03 hrs.**
Course Code: ECEG 2043 **Max. Marks: 100**

Instructions:

SECTION A
(5Qx4M=20Marks)

Q. No.		Marks	CO
Q 1	List any 4 static characteristics of instruments.	4	CO1
Q 2	A thermocouple is calibrated 100ºC to 250ºC. The accuracy is specified within ±0.75. Calculate the maximum static error?	4	CO2
Q 3	Distinguish between: a) Accuracy and precision b) Repeatability and reproducibility	2+2	CO2
Q 4	Calibration of a bimetallic thermometer gave the following data. Determine the maximum hysteresis error as % of full scale range. **Increasing input:** Standard ºC: 0.0 10.0 20.0 30.0 40.0 Bimetallic thermometer ºC: 0.0 10.0 19.9 29.9 40.0 **Decreasing input:** Standard ºC: 40.0 30.0 20.0 10.0 0.0 Bimetallic thermometer ºC: 40.0 30.0 20.1 10.1 0.0	4	CO3
Q 5	It is required to measure the temperature of a furnace interior, which temperature measuring instrument is best suited for this purpose? Justify your answer.	4	CO2

SECTION B
(4Qx10M= 40 Marks)

| Q 6 | For the below set of data, calculate the mean, median, mode, standard dev and variance.

34,45,67,34,55,88,45,34,24,87,67,78,90,65,33 | 10 | CO3 |

Q 7	Briefly describe the optical method of measurement of humidity with the help of a diagram. **OR** Explain the principle of operation of the electrolytic hygrometer with the help of a diagram.	10	CO1
Q 8	What is pH? With the help of a diagram explain the principle of measurement of pH.	10	CO1
Q 9	It is required to install a level indicator system in a wastewater tank containing wastewater having a lot of suspended solids. Which level sensor would you choose? Mention the complete principle of operation of the chosen sensor with the help of a diagram.	10	CO3
SECTION-C **(2Qx20M=40 Marks)**			
Q 10	Distinguish between thermocouples and RTDs based on the construction, principle of operation, accuracy, range, sensitivity, advantages, applications **OR** Distinguish between pyrometers and resistance temperature sensors based on the construction, principle of operation, accuracy, range, sensitivity, advantages, applications	20	CO1,CO2
Q 11	Derive an expression for the gauge factor of a resistive strain gauge. (10 M) Mention the applications, advantages and disadvantages of resistive strain gauges. (8 M). Assuming that the strain gauges installed in a building are giving erroneous readings due to changes in ambient temperature, what would you do? (2M)	20	CO3,CO4