

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2024

M. Tech.-I Semester (CSE/IT/ECE/CE/BT/BI)

COURSE CODE (CREDITS): 21M11EC111 (3)

MAX. MARKS: 25

COURSE NAME: SENSOR AND SMART INSTRUMENTATION

COURSE INSTRUCTORS: Dr. Harsh Sohal

MAX. TIME: 1 Hour 30 Minutes

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No.	Question	CO	Marks
Q1	What are the criteria for transducer selection for an application? Why the transducer selection is considered very important in measurement systems? Justify with example(s).	CO 1	3
Q2	Describe the general architecture of a smart sensor with various components using a block diagram. What are the advantages and disadvantages of smart sensors over traditional sensors?	CO 5	3
Q3	What is calibration? What are the three basic types of calibration? Give the detailed description of soft calibration with reference to smart instrumentation systems? Can we reduce Random Errors using calibration?	CO 2	4
Q4	(a) What is a transducer? What are the basic requirements of a transducer? (b) Give a comparison of Active and Passive Transducers with examples and working.	CO 1	2+2
Q5	You are provided with an RTD, a thermister, a radiation pyrometer. You are asked to measure the temperature of a furnace (Temperature of the order of 2000 degree Celcius). Which of the above will be the best choice? Answer the question while discussing pros and cons of each of the given devices w.r.t. their characteristics.	CO4	4
Q6	Near room temperature, the thermo emf generated in a copper-constantan couple is 60 μ V per degree Celsius. What is the smallest	CO3	3

	temperature that can be detected with a single such couple and a galvanometer of 90Ω resistances capable of detecting current as low as $8 \mu\text{A}$.		
Q7	<p>A platinum thermometer has a resistance of 100Ω at 25°C. Find its resistance at 55°C</p> <p>(i) if the platinum has a resistance temperature co-efficient of $0.00392/^\circ\text{C}$.</p> <p>(ii) If the thermometer has a resistance of 175Ω, calculate the temperature.</p>	CO3	2+2