JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2024

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

COURSE CODE (CREDITS): 21M11EC111 (3)   MAX. MARKS: 15

COURSE NAME: SENSOR AND SMART INSTRUMENTATION

COURSE INSTRUCTORS: Dr. Harsh Sohal   MAX. TIME: 1 Hour

Note: (a)All questions are compulsory.

(b)Marks are indicated against each question in square brackets.

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

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Q1. [CO1] Define and explain the following terms (in reference to measurement systems) with suitable examples. [4]

    (a) Sensitivity   (b) Transducer   (c) Resolution   (d) Gross errors

Q2. [CO2] The current passing though a resistor of (100 ± 0.2) Ω is (2.00 ± 0.01) Amperes. Calculate the limiting error in the computed value of power dissipated. [2]

Q3. [CO1] (a) You are given two quantities with their tolerances $N_1 = 826 \pm 5$; $N_2 = 628 \pm 3$. Calculate (i) $N_1 + N_2$ (ii) $N_1 - N_2$ and express the resulting error/doubt/tolerance in percentage terms in both the cases. [2]

Which of the above two methods (addition or subtraction of quantities) should be preferred in an experimental measurement and why? Explain. [1]

(b) Calculate the voltage drop (up to correct significant figures); if a current of 2.12 A is recorded by an Ammeter in a resistance of 36.68 Ω. [1]

Q4. [CO2] A voltmeter, having a sensitivity of 2000 Ω/V, reads 40 V on its 150-V scale when connected across an unknown resistor in series with a milli-Ammeter. When milli-Ammeter reads 800 mA, calculate

  i.   The *apparent* resistance of the unknown resistor;   [1]

  ii.   The *actual* resistance of the unknown resistor;   [1]

  iii. The *error* (in percentage) due to the loading effect of the voltmeter. [2]

       Also draw circuit diagram(s).   [1]