VR20 Reg. No: | | | | | | | | | | |

VELAGAPUDI RAMAKRISHNA

SIDDHARTHA ENGINEERING COLLEGE

(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, DECEMBER - 2023

Third Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

20EI3304 SENSORS AND TRANSDUCERS

Time: 3 hours ***Max. Marks: 70***

Part-A is compulsory

Answer One Question from each Unit of Part - B

Answer to any single question or its part shall be written at one place only

PART-A

10 x 1 = 10M

1. a. What is the difference between range and span? **(CO1 K1)**

   b. Define fidelity. **(CO1 K1)**

   c. What are the different factors that affect the choice of a transducer? **(CO2 K1)**

   d. How the errors caused by loading effect can be reduced? **(CO1 K1)**

   e. List any two applications of variable capacitive type transducers. **(CO3 K1)**

   f. Distinguish between dead time and dead zone. **(CO1 K2)**

   g. What is Peltier effect? **(CO2 K1)**

   h. What is smart sensor? **(CO2 K1)**

   i. List any two applications of inductive transducer. **(CO2 K1)**

   j. List out the methods used for velocity measurement. **(CO3 K1)**

PART-B

4 x 15 = 60M

UNIT-I

2. a. Draw the block diagram of generalized instrument system and discuss about the functionality and significance of each block in detail. **(CO1 K2) 7M**

   b. Explain briefly about various errors that occurring during measurements. **(CO1 K2) 8M**

(or)

3. a. Explain briefly about dynamic characteristics of measurement system with suitable examples. **(CO1 K2) 7M**

   b. Identify the most probable straight line for the data given below by the method of extended differences. **(CO1 K3) 8M**

X	1	3	5	7	11	14
Y	1	2	4	7	8	10

UNIT-II

4. a. Illustrate the operating principle of photovoltaic cell, with a neat diagram. Also, discuss its current vs luminous flux characteristics. **(CO2 K3) 7M**

   b. Explain the principle of operation of hot wire anemometer. **(CO2 K2) 8M**

(or)

5. a. Explain the principle of any one of inductive transducer with necessary diagrams. **(CO2 K2) 7M**

   b. Define gauge factor of a strain gauge and derive the expression of gauge factor for metals and semiconductors. **(CO2 K2) 8M**

UNIT-III

6. a. With the help of neat block diagram, explain the operation of variable reluctance accelerometer. **(CO3 K2) 7M**

   b. Illustrate the principle, construction, and operation of LVDT **(CO3 K2) 8M**

(or)

7. a. Explain how displacement is measured using capacitive transducer? **(CO3 K2) 7M**

   b. With the help of neat diagram, explain the operation of various capacitive transducers. **(CO3 K2) 8M**

UNIT-IV

8. a. With a neat sketch, explain the operation of Hall effect sensor and how it is used in displacement measurement? **(CO4 K2) 7M**

   b. What is a bio sensor and in what respect it is different from the industrial versions? Discuss about its structure, composition, with a neat diagram. **(CO4 K2) 8M**

(or)

9. a. What are ultrasonic sensors? List their applications. Illustrate the operation of ultrasonic sensors. **(CO4 K2) 7M**

   b. Explain in detail about the fiber optic sensors and list their advantages. **(CO4 K2) 8M**

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