

VR20



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VELAGAPUDI RAMAKRISHNA
SIDDHARTHA ENGINEERING COLLEGE
(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, JANUARY, 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. Define Precision of an Instrument. (CO1 K1)
 - b. Define standard Deviation. (CO1 K1)
 - c. Define Transducer. (CO2 K1)
 - d. On which principle inductance Transducer generally work? (CO2 K2)
 - e. List the applications of Capacitive Transducer. (CO2 K3)
 - f. Explain Frequency of Capacitive Transducer. (CO2 K2)
 - g. Define configuration of smart sensors. (CO3 K1)
 - h. List the types of Strain gauges. (CO3 K2)
 - i. What is the operating principle of colour sensors? (CO4 K2)
 - j. What is the use of IR radiation Sensors. (CO4 K2)



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PART-B

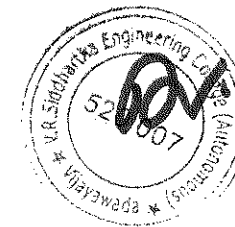
4 x 15 = 60M

UNIT-I

2. a. Outline the desirable Dynamic characteristics of instrument. (CO1 K4) 6M
- b. The following 10 Observations were recorded when measuring voltages. 8.82, 8.06, 8.55, 7.52, 8.86, 7.63, 7.79, 7.78, 8.25, and 7.77. Calculate arithmetic mean, standard deviation, variance. (CO1 K3) 9M
- (or)
3. a. Calculate Dynamic response of Second order instruments to step Response. (CO1 K3) 6M
- b. A voltmeter reading 70V on its 100V range and an ammeter reading 80mA on its 150mA range are used to determine the power dissipated in a resistor. Both these instruments are guaranteed to be accurate within $\pm 1.5\%$ at full scaled deflection. Determine limiting error of the power. (CO1 K3) 9M

UNIT-II

4. a. Explain Construction details, Characteristics and applications of Resistance Potentiometer. (CO2 K2) 8M
- b. Differentiate between the following with suitable examples and necessary diagrams.
- i) Primary and Secondary transducers
 - ii) Active and Passive Transducers
 - iii) Analog and Digital. (CO2 K2) 7M



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(or)

5. a. Illustrate thermistors working principle with diagram. (CO2 K2) 8M
- b. Discuss the properties of materials used in construction of RTD. (CO2 K3) 7M

UNIT-III

6. a. Illustrate the principle, construction and operation of LVDT. (CO3 K3) 8M
- b. Illustrate the principle, construction and operation of RVDT. (CO3 K3) 7M
- (or)

7. a. Outline the working of variable reluctance accelerometer. (CO3 K2) 7M
- b. Illustrate the variable area working principle of capacitive transducers in detail with one application. (CO3 K3) 8M

UNIT-IV

8. a. Explain structure of Bio sensor in detail. (CO4 K2) 7M
- b. Explain displacement measurement using fiber optic sensors. (CO4 K2) 8M
- (or)
9. a. Explain the configuration of smart sensor with neat sketch. (CO4 K2) 6M
- b. Explain the Operation of proximity sensor and ultrasonic Flow meter in industrial applications. (CO4 K2) 9M

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