

- Instructions:
- (1) Question No. 1 is compulsory.
  - (2) Attempt any 3 out of remaining questions
  - (3) Figures indicate to the full marks.
  - (4) Assume suitable data if necessary.

Q.1 Answer the following.

- a) Classify transducers with suitable example.
- b) Define i) Accuracy ii) Sensitivity
- c) Explain working principle of-
  - i) Piezo electric transducers
  - ii) Piezo resistive transducers
- d) Find seebeck voltage for a thermocouple with proportionality constant of  $40\mu\text{V}/^\circ\text{C}$  if the junction temperatures are  $40^\circ\text{C}$  and  $80^\circ\text{C}$ .

Q.2 a) Draw and explain working of LVDT. What causes residual voltage to occur? (10)

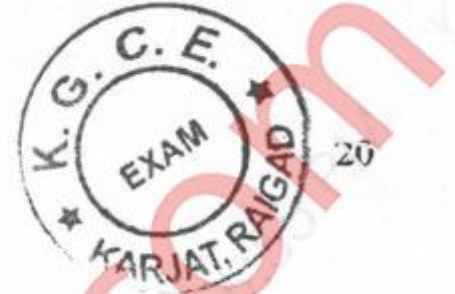
- b) A voltmeter having a sensitivity of  $1000\ \Omega/\text{V}$  reads 100 V on its 150 V scale when connected across an unknown resistor in series with milliammeter. When milliammeter reads 5 mA, Calculate i) Actual resistance of the unknown resistor.  
ii) Error due to loading effect of voltmeter. (10)

Q.3 a) Explain any five static characteristics of transducer with suitable examples. (10)

- b) What is the need of lead wire compensation? How it is to be done in RTD? What is self heating effect in RTD? (10)

Q.4 a) For a certain thermistor  $\beta = 3140\ \text{K}$  and at  $27^\circ\text{C}$  is known to be  $1050\ \Omega$ . The thermistor is used for temperature measurement and the resistance measured is as  $2330\ \Omega$ . Find the measured temperature. (10)

b) Draw set up and explain working of air purge method of level measurement. (10)



Q.5 a) Explain radioactive type level detector in detail. (10)

b) A capacitive transducer uses two quartz diaphragm of area  $750\text{mm}^2$  separated by a distance of  $3.5\text{ mm}$ . A pressure of  $900\text{ KN/m}^2$  when applied to top diaphragm produces a deflection of  $0.6\text{ mm}$ . The capacitance is  $370\text{ pF}$  when no pressure is applied to the diaphragm. Find the value of capacitance after the application of pressure  $900\text{ KN/m}^2$ . (10)

Q.6 Write short notes (any TWO) (20)

- a) Optical pyrometer
- b) Rotary encoder
- c) Types of error

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