Code No: 155SC

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2021
INSTRUMENTATION AND CONTROL SYSTEMS
(Mechanical Engineering)

Time: 3 Hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

1.a) Discuss the following transducers concerning their construction, working and characteristics used for distance measurement
i) Piezo-electric
ii) Capacitance
b) With the help of a suitable example, explain the functional description of various elements of a generalized measuring system. [8+7]

2.a) Explain the dynamic performance characteristics of measuring instruments.
b) Explain the following
i) Accuracy
ii) Sensitivity
iii) Dead Zone
iv) Hysteresis [7+8]

3.a) Thermistor has resistance at 25^0 C is 120Ω. If the temperature co-efficient of resistance β is $4000/^0$C, then find its resistance at 100^0 C.
b) State and explain the different laws of thermocouples. [5+10]

4.a) Explain how pressure is measured using deadweight pressure gauges.
b) By utilizing ionization pressure gauges explain how low pressure is measured with a neat diagram. [8+7]

5.a) Name the different mechanical tachometers. Sketch and explain the working of a centrifugal tachometer.
b) Describe in detail with neat sketches:
i) Turbine flow meter
ii) Cryogenic fuel method. [7+8]

6.a) Explain the working principle of non-contact type of electrical transducers.
b) With relevant diagram explain the construction and working of the rotameter. [7+8]

7.a) A 200 Ω strain gauge is bonded to a steel bar which is subjected to a tensile load. Cross-sectional area of the bar is 0.8×10^{-4} m^2 and E = 200 GN/m^2. Determine the gauge factor of the gauge.
b) Explain the working principle of the torsion meter and dew point meter. [5+10]

8.a) Suggest a simple control system that automatically turns on a room lamp at dusk and turns it off in daylight. Draw the schematics and block diagram of the suggested control system.
b) What is a servomechanism? Describe the features of a servomechanism. [8+7]

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