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Code No: 155SC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, August - 2022

INSTRUMENTATION AND CONTROL SYSTEMS

(Mechanical Engineering)

Time: 3 Hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Explain the static and dynamic characteristics of measurement systems with help of typical examples and sketches.
- b) Explain in detail the errors in measurement system and their elimination. [8+7]
- 2.a) Write principle, construction and working of piezo electric and photoelectric type transducers.
- b) What is calibration? Describe the calibration procedure for pressure and temperature gauges. [8+7]
- 3.a) Describe the construction and working principle of resistance thermometer and draw the measurement circuit using RTD and explain its working.
- b) Explain with neat sketch the construction and working of a disappearing filament type optical pyrometer. [8+7]
- 4.a) Explain the theory, construction and working of dead weight pressure gauge tester.
- b) Explain the principle and working of thermal conductivity and ionization type vacuum gauges with neat sketches. [7+8]
5. Explain the following level measurement techniques with help of neat diagrams
 - a) Capacitive level sensors
 - b) Radioactive level sensors
 - c) Ultrasonic level sensors. [5+5+5]
- 6.a) Explain the principle, construction and working of Laser Doppler Anemometer with a neat sketch.
- b) Explain the principle and working of tacho meters, accelerometers and vibrometers. [7+8]
- 7.a) Explain the principle and working of strain gauges and derive the expression for gauge factor. Describe the use of strain gauge for measuring torque with a neat sketch.
- b) Explain with neat sketch the measurement of force using hydraulic and pneumatic load cells. [8+7]
- 8.a) Explain with help of block diagrams the working of open loop and closed loop control systems and compare their performance.
- b) Define transfer function of a measurement system? Derive the transfer function of a second order mechanical system with a typical example. [7+8]

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