Code No: 154BC **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year II Semester Examinations, March - 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 working of ionization transducer for the measurement of displacement .
b) Explain briefly the static and dynamic characteristics of measuring instruments. [7+8]

2.a) Describe the elements present in the generalized measuring system block with the suitable examples.
b) By employing LVDT explain how displacement is measured with relevant diagram. [8+7]

3.a) State law of thermocouples. How are the laws useful in construction of thermocouple thermometers?
b) Explain the working of ionization pressure gauge with a neat sketch. [8+7]

4.a) A McLeod gauge is available with bulb and measuring capillary volume of 150×10^6 mm^2 and a capillary of diameter 0.3 mm. Calculate the gauge reading for a pressure of 30 μm.
b) Explain various arrangements of manometers for pressure measurement. [6+9]

5.a) Explain the working principle involved in seismic instrument.
b) A seismic accelerometer sensing displacement has an undamped frequency of 20 Hz and a damping ratio of 0.7. Calculate i) its damped frequency ii) the amplitude ratio and phase angle between the motion of the seismic mass and the applied vibration if the latter is a sinusoidal displacement at a frequency of 30Hz and 1kHz. [8+7]

6.a) Write short notes on cryogenic fuel level indicator.
b) Why rotameter is called variable area flow meter? Describe its construction and working with a neat sketch. [7+8]

7.a) Explain the working of Load Cells and enumerate its applications.
b) Discuss in detail the working of any one type of dynamometers used for force measurement. [8+7]

8.a) Describe a typical closed loop control system that can be used to control the temperature of water being heated by steam.
b) What is servomechanism? Describe the features of a servomechanism? [8+7]

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