

Roll No.

Total Pages : 03

BT-7/D-19

37056

MEASUREMENTS AND CONTROL

ME-403-E (Opt. ii)

Time : Three Hours]

[Maximum Marks : 100

Note : Attempt Five questions in all, selecting at least one question from each Unit. All questions carry equal marks.

Unit I

1. (a) List and explain the various merits and demerits of mechanical measuring instruments. 10
- (b) Draw and explain generalised measurement system and its functional elements. 10
2. (a) Differentiate between mechanical and electrical measuring systems. 10
- (b) Write notes on the following :
 - (i) Propagation of uncertainties in compounding quantity 5
 - (ii) Precision and Drift. 5

Unit II

3. (a) Discuss the dynamic response of a first order mechanical systems with ramp input. 10
- (b) Explain Chauvenet's criteria of rejecting a dubious data. 10
4. (a) Describe generalised mathematical model of measuring systems. 10
- (b) Write short notes on the following :
 - (i) Curve Fitting 5
 - (ii) Types of measuring data and statistical attributes. 5

Unit III

5. (a) Write the working principle and construction theory of operation of metallic resistance strain gauges. 10
- (b) Discuss measurement of load, force and thrust using resistant strain gauges. 10
6. (a) Describe the mathematical analysis of DC Wheatstone bridge circuits. 10
- (b) Discuss measuring of torque in transmission shaft under axial loads in varying ambient conditions. 10

Unit IV

7. (a) Draw SFGs for the following sets of algebraic equations. These equations should be arranged in the form of cause-and-effect relations before SFGs can be drawn. Show that there are many possible SFGs for each set of equations : 10

$$2x_1 + 3x_2 + x_3 = -1$$

$$x_1 - 2x_2 - x_3 = 1$$

$$3x_2 + x_3 = 0$$

- (b) List and explain the various properties of Laplace transform. 10

8. Find C_1/R_1 for the control system shown in Fig. below : 20

