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**B.Tech. Degree VI Semester Special Supplementary Examination  
August 2018**

**ME 601 INSTRUMENTATION AND CONTROL SYSTEMS  
(2006 Scheme)**

Time : 3 Hours

Maximum Marks : 100

**PART A  
(Answer ALL questions)**

(8 × 5 = 40)

- I. (a) Explain the input-output configuration of measuring instruments.  
 (b) Explain potentiometer as a Zero order instrument with the help of a sketch.  
 (c) Differentiate between Bonded and Unbonded strain gauge.  
 (d) Explain the working of a microphone with a neat sketch.  
 (e) Describe the various time domain specifications.  
 (f) Explain liquid level systems with the help of an example.  
 (g) Discuss the working of tacho generators with the help of a neat sketch.  
 (h) Use the Routh stability criteria to determine the location of roots on the S-plane and hence the stability for the system represented by the characteristic equation:

$$S^7 + 5S^6 + 9S^5 + 9S^4 + 4S^3 + 20S^2 + 36S + 36 = 0.$$

**PART B**

(4 × 15 = 60)

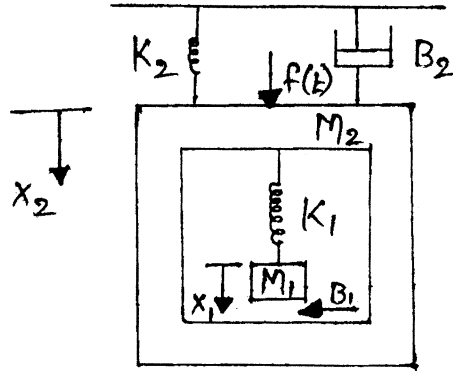
- II. (a) Explain the functional elements of a measuring system with the help of an example. (10)  
 (b) Obtain the ramp response of a First order instrument. (5)
- OR**
- III. (a) Discuss the methods of correction for spurious inputs. (10)  
 (b) Explain a second order instrument with an example. (5)
- IV. (a) Describe scintillation counter with the help of a neat figure. (9)  
 (b) Explain the working of an optical pyrometer with the help of a neat sketch. (6)
- OR**
- V. (a) Explain the Law's of Thermocouple. (6)  
 (b) Explain any one Torque measuring instrument with the help of a neat sketch. (9)
- VI. A unity feedback control system is characterized by the following open loop Transfer function  $G(s) = \frac{10}{s(s+2)}$ . Determine the rise time, percentage overshoot, peak time and settling time for a step input of 12 units. (15)

**OR**

(P.T.O.)



- VII. Write the differential equations governing the mechanical system as shown in the figure below. Draw the force-Voltage and force-current electrical analogous circuits and verify by writing mesh and node equation. (15)



- VIII. Sketch the root locus for the unity feedback system whose open loop transfer function is given by  $G(s)H(s) = \frac{K(s+1.5)}{s(s+1)(s+5)}$ . (15)

OR

- IX. Sketch the bode plot for the following transfer function and determine the phase margin and gain margin,  $G(s) = \frac{75(1+0.2s)}{s(s^2+16s+100)}$ . (15)

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