

GUJARAT TECHNOLOGICAL UNIVERSITY
PDDC - SEMESTER – VII • EXAMINATION – WINTER 2012

Subject code: X 71904

Date: 01/01/2013

Subject Name: Control Engineering

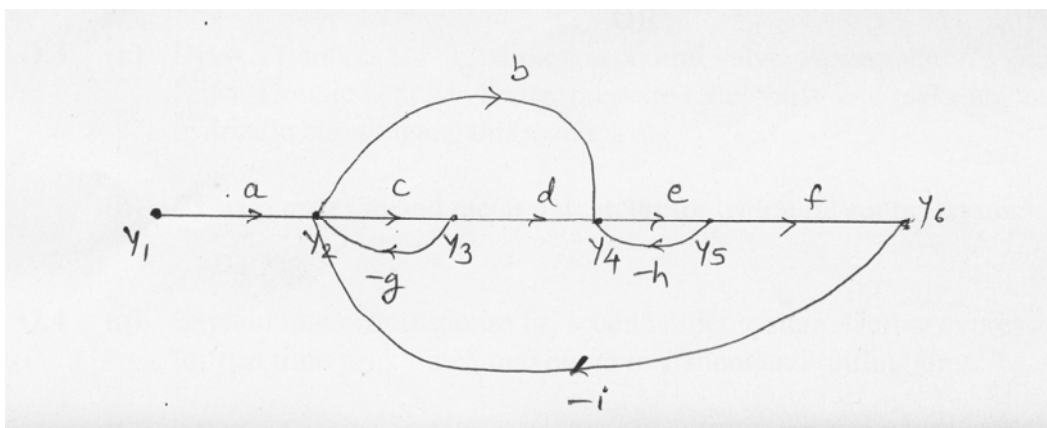
Time: 10.30 am - 01.00 pm

Total Marks: 70

Instructions:

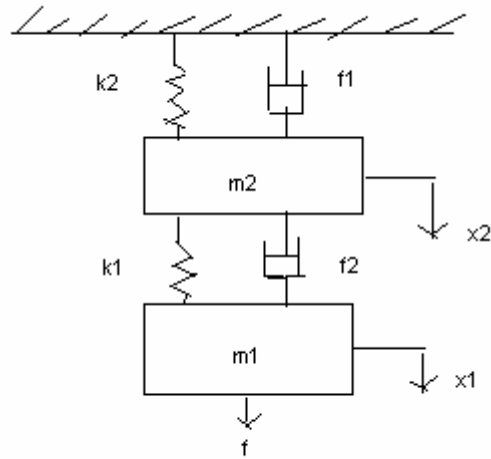
1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** Compare open loop and close loop control systems. write down major advantage and disadvantages of control system closed loop **07**
- (b)** What is transfer function derive the equation for transfer function for closed loop system **07**
- Q.2 (a)** What is signal flow graphs? Define node, branch, source, sink , path , loop and loop gain.Explain Masons gain formula with their steps. **07**
- (b)** Solve figure and find transfer function with masons gain formula. **07**

**OR**

Solve figure and find a transfer function. Where k_1, k_2 stiffness f_1, f_2 damping coefficients, f is a force. **07**

(b)



- Q.3 (a)** Write down advantages and disadvantages of hydraulic control system. Also explain basic components of hydraulic control system. **07**
- (b)** Write the comparison of pneumatic control system and hydraulic control system. Sketch a schematic diagram of a pneumatic nozzle flapper amplifier system and explain its working. **07**

OR

- Q.3 (a)** Draw a symbols for 3/2 direction control valve, Accumulator, Pump, Filter, Double acting cylinder, pressure relief valve and make any one hydraulic circuit using this symbol. **07**
- (b)** Explain meter in and meter out circuit for hydraulic control system. **07**
- Q.4 (a)** Explain transient response for second order system. Derive expression for rise time peak time , maximum overshoot and settling time **07**

- (b)** For a forward path transfer function $G(S) = \frac{25}{S(S+6)}$ having unity feed back system Find the expression for unit step response , rise time, peak overshoot **07**

OR

- Q.4 (a)** Write a short note on programmable logic controller with any one ladder diagram. **07**
- (b)** Describe a control system for boiler feed water system. **07**

- Q.5 (a)** What is state space representation in control system. Explain it with at least one example. **07**
- (b)** Describe control system for thermal power plant **07**

OR

- Q.5 (a)** Define degree of membership , fuzzification and difuzifiction , and rule base system. Also define crisp relations and fuzzy relations. **07**
- (b)** Explain a control system for liquid level system giving at least one example. **07**
