

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER- IV(NEW) EXAMINATION – SUMMER 2015

Subject Code: 2141708

Date: 28/05/2015

Subject Name: Control System

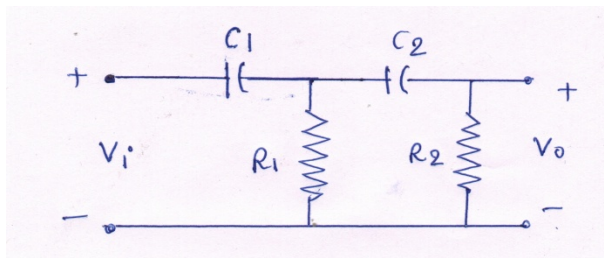
Time: 10:30am-1.00pm

Total Marks: 70

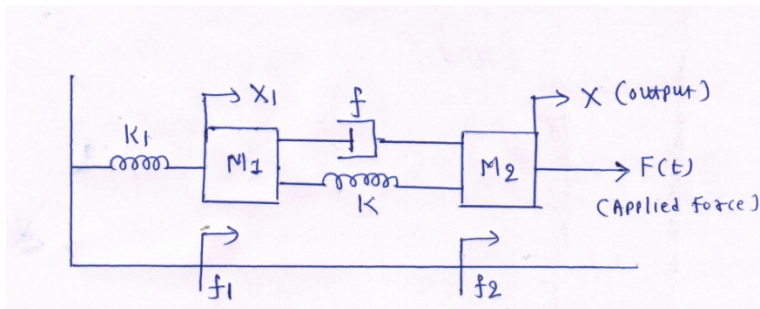
Instructions:

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

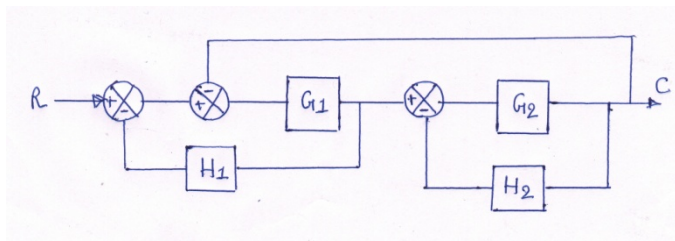
- Q.1** (a) Give general block diagram of open loop and closed loop transfer function. **07**
 Explain each system with suitable example.
- (b) Define transfer function. Explain relationship between impulse response and transfer function of any system. Discuss advantages and disadvantages also. **07**
- Q.2** (a) What is Root Locus? Write the various rules for drawing root locus. **07**
 (b) Determine the transfer function for following electrical network system **07**

**OR**

- (b) Derive mathematical modeling of following mechanical system. **07**



- Q.3** (a) Derive the equation of Peak time and Peak overshoot for underdamped second order system. **07**
- (b) Using block diagram reduction techniques, find the closed loop transfer function of the system whose block diagram is given by following figure. **07**

**OR**

- Q.3** (a) Find the transfer function for the system shown below using Mason's gain **07**

- 07

Using Routh criterion , calculate the range of k for the system to be stable. If the value of k=1, comment on stability.

- 07

Find the root locus as K is varied from 0 to ∞ .

- 07

Q.4 (a) Sketch the root locus plot of the control system whose open loop transfer function is given by

(b) Determine the transfer function from the data given below.

- 07

Determine whether the system is stable when the feedback path is closed. Use nyquist stability criterion.

- 07

OR

- 07

Determine whether the system is stable when the feedback path is closed. Use nyquist stability criterion.

- 07

From the Bode plot, determine GM and PM.

Find the value of k for which the closed loop system become marginally stable.

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