PVP 14

Code: EC4T1

II B.Tech - II Semester – Regular/Supplementary Examinations – April 2017

CONTROL SYSTEMS
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

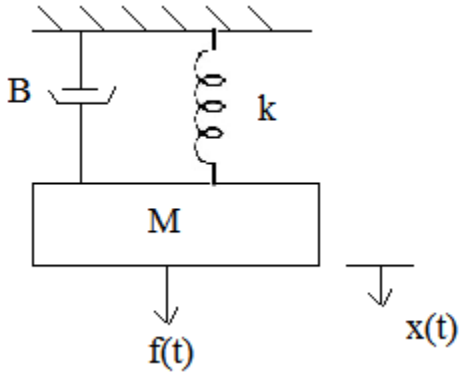
Answer ***all*** the questions. All questions carry equal marks

11 x 2 = 22

1.

a) Compare the open loop system with closed loop system.

b) Draw the analogous electrical network for the mechanical system in figure using force-voltage analogy.



c) What are the various time domain Specifications?

d) What is the effect of PID controller on the system performance?

e) State the limitations of Routh- stability criterion.

f) State the method of determining the gain K at a point on root locus.

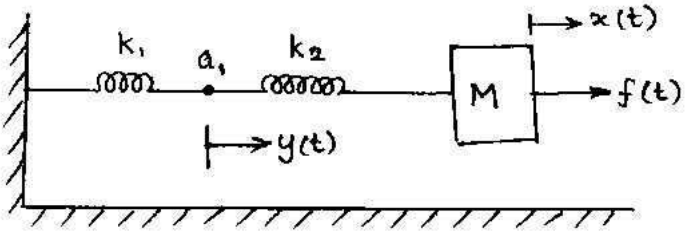
g) List the advantages of bode plots.
h) State Nyquist stability criterion.
i) List the procedure to sketch the bode plot of a given function.
j) What is controllability and observability?
k) What are the advantages of state-space approach?

PART – B

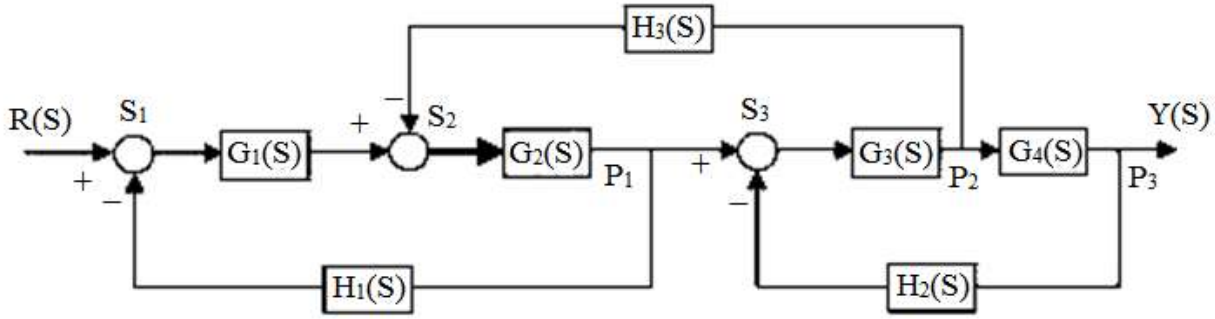
Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Consider the mechanical system shown below. Identify the variables and write the differential equation. 8 M



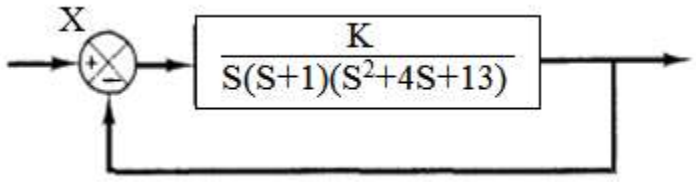
b) For the system represented by block diagram shown in figure. Determine Y(s) /R(s). 8 M



3. a) Consider the 2nd order control system, where ξ= 0.6 & Wn = 5 rad / sec, obtain the rise time tr, peak time tp, max overshoot Mp and settling time ts When the system is subject to a unit step i/p. 8 M

b) For a unity feedback system whose open loop transfer function is G(s) = 50/(1+0.1s)(1+2s), find the position, velocity & acceleration error Constants. 8 M

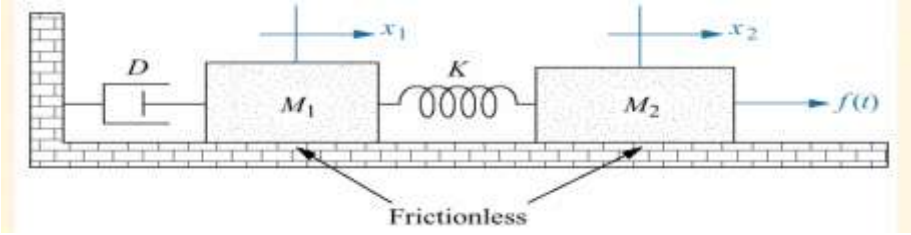
4. Sketch the root loci of the following control system. 16 M



5. Obtain the bode plot of the system given by the transfer function. 16 M

$$G(s) = \frac{2000(s+0.5)}{s(s+10)(s+50)}.$$

6. a) Obtain a state space representation of the system shown in Figure. 8 M



b) Draw the block diagram, and write the state equations in phase variable form, for a system with the differential equation. 8 M

$$\frac{d^3y}{dt^3} + 7\frac{d^2y}{dt^2} + 19\frac{dy}{dt} + 13y = 13\frac{du}{dt} + 26u$$