PVP 14

Code: EE4T5

II B.Tech - II Semester – Regular/Supplementary Examinations
April 2019

CONTROL SYSTEMS
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

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

11 x 2 = 22 M

1.

a) Define an open loop control system.
b) Why negative feedback is invariably preferred in closed loop system?
c) What is Mason's gain formula?
d) What is transient response?
e) What are the requirements for BIBO Stability?
f) What is Routh-Hurwitz criterion?
g) Define Gain margin.
h) Write a short notes on Lag compensator.
i) Write any two properties of state transition matrix.
j) Define Observability.
k) Define State and State variable.

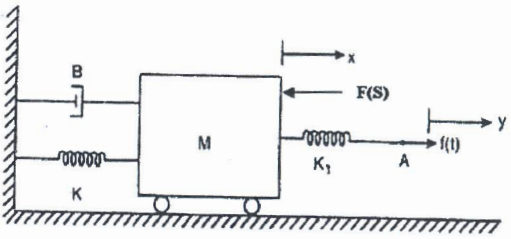
PART – B

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

3 x 16 = 48 M

2. a) Write a short note on open loop and closed loop systems and explain their applications (any two). 8 M

b) Write the differential equations, obtain Transfer function X(s)/F(s) for the system shown in figure. 8 M



3. a) Derive the response for second order system for under damped case and when the input is unit step. 8 M

b) For a unity feedback system find the static error coefficients, whose open loop transfer function is $G(s)H(s) = \frac{10}{s(1+s)(1+2s)}$. And also find the steady state error for unit step input. 8 M

4. Sketch the root locus for the unity feedback system whose open loop transfer function is $G(S) = \frac{K}{s(S^2+6s+10)}$.

16 M

5. Sketch the Nyquist plot for a system with the open loop transfer function $G(S)H(S) = \frac{K(1+0.5s)(1+s)}{(1+10s)(s-1)}$. Determine the range of values of K for which the system is stable. 16 M

6. a) Discuss in detail about the state space representation of Linear time Invariant system and derive state space model. 10 M

   b) Explain the advantages of state space model over input-output model. 6 M