APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FOURTH SEMESTER B.TECH DEGREE EXAMINATION 2016
Course Code: IC 202
Course Name: Linear Systems and networks
Model Question Paper

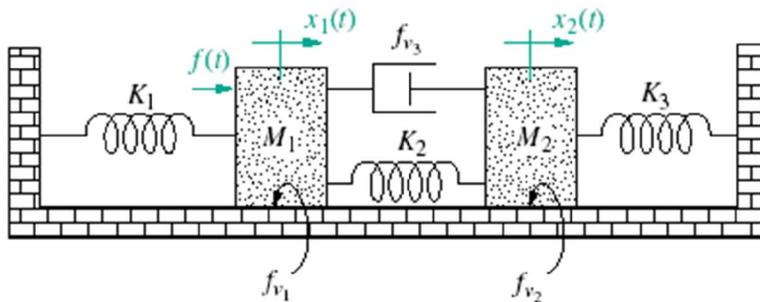Max.marks:100   Duration: 3 Hours

PART-A
(Answer Any Two)

1. (a)What are the advantages and disadvantages of open and closed loop control system?

(5Marks)

(b) Obtain the transfer function $X_2(S)/F(S)$ for the system shown below

(10Marks)

2.(a) Derive the differential equation and obtain the transfer function $E(S)/\theta(S)$ for an armature controlled DC motor coupled to a mechanical load having inertia 'J' and a viscous friction co-efficient 'b'.   (10Marks)

(b) Find the poles and zeros of the function $$G(s) = \frac{(s^2 + 9)(2 + 5s)}{(s^2 + 16)(2 + 3s)}$$

(5Marks)

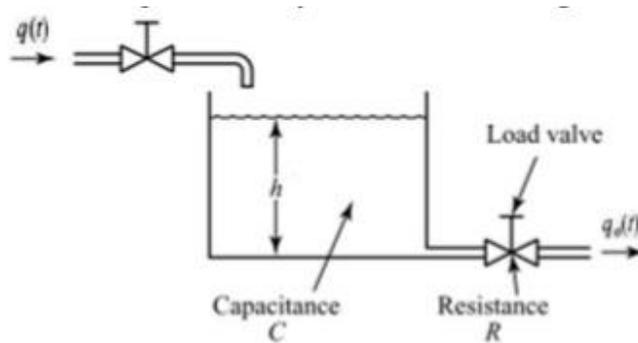3.(a) What is meant by poles and zeros of a system's transfer function? Explain

(4Marks)

(b) Explain the relation between impulse response and transfer function of a system.

(3.5Marks)

(c) Consider the liquid level system shown below. Obtain its transfer function $H(S)/Q(S)$

(7.5Marks)

q(t)

Load valve

h

q_o(t)

Capacitance
C

Resistance
R

Part – B

(Answer Any Two)

4. Derive the DC response of RL,RC,RLC.

5. Explain the following
   a. Initial conditions of R,L, C
   b. Final condition of R,L, C
   c. Time constant from the DC response of RL circuit.

6. Derive the following
   a. Sinusoidal response of RC and RLC circuit
   b. Time constant from the DC response of RC circuit   (2x15)

Part – C

(Answer Any Two)

7. Answer the following
   a. Restrictions of poles and zeros locations for driving point function and transfer functions.
   b. Derive time domain behavior from pole zero plot of given transfer function.

$$I(s) = \frac{(S+2)}{(S+1)(S+5)}$$

8. Answer the following
   a. Derive Short circuit and open circuit parameters
   b. Obtain the hybrid parameter for the following circuit.
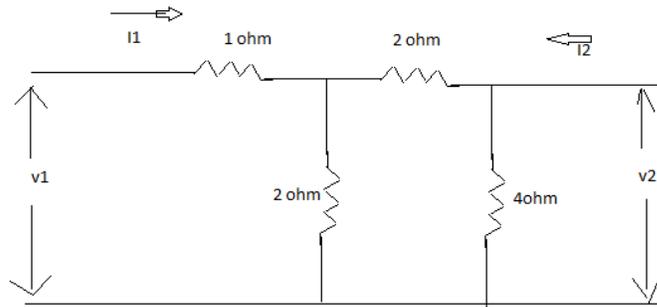
9. Obtain a) the relationship between Z and Y parameters.

b) Find the response from pole zero plot and verify for the following Voltage.

$$V(s) = \frac{(S+5)}{(S+1)(S+6)}$$ (2x20)