B.E/ B.Tech DEGREE END SEMESTER EXAMINATIONS, MAY/JUN 2013

B.E- Computer Science Engineering (FULL TIME)

EE - 9262/ Electrical Engineering and Control Systems

IV - SEMESTER (REG: 2008)

Time : 3 Hours Max.Mark : 100

Answer ALL Questions

Part-A(10*2 =20 Marks)

1. Write the mesh equations by inspection method for the circuit shown in Figure 1.

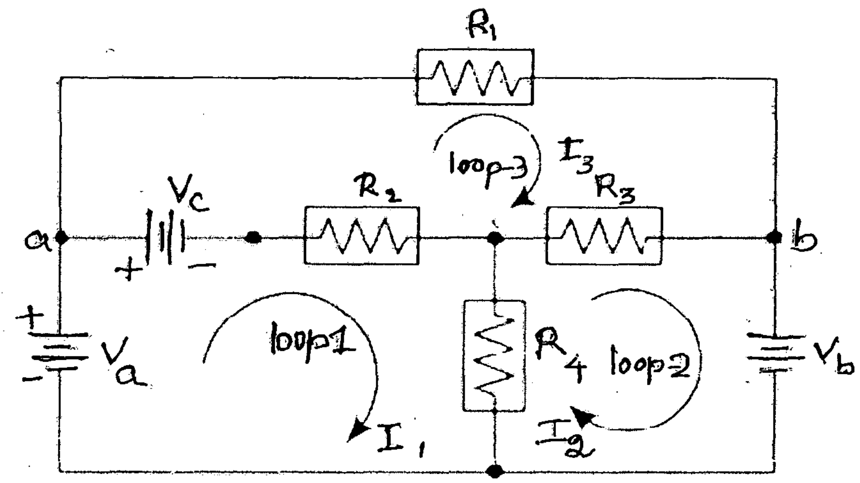

Figure 1 Circuit diagram for Question.1

2. Mention the applications of maximum power transfer theorem.
3. Write the expression of slip for both forward and back ward rotating magnetic field in a double field revolving theory.
4. What type of motor is preferred for traction applications? Justify.
5. What will happen to the system when the summing point is moved after the gain block of value G.
6. Write the mason's gain formula and explain each term.
7. Gain margin and phase margin for the given system is infinity and 45°. Comment about the stability of the system.
8. Based on the value of damping ratio, classify the types of second order system.
9. What are the advantages of state variable analysis?
10. Write the solution for the state equation of the given system without input.

Part B-(5*16=80 Mark)

11. Obtain the state model for the following.(Figure. 2). Assume that the voltage applied across AB is 'E' volts (16)

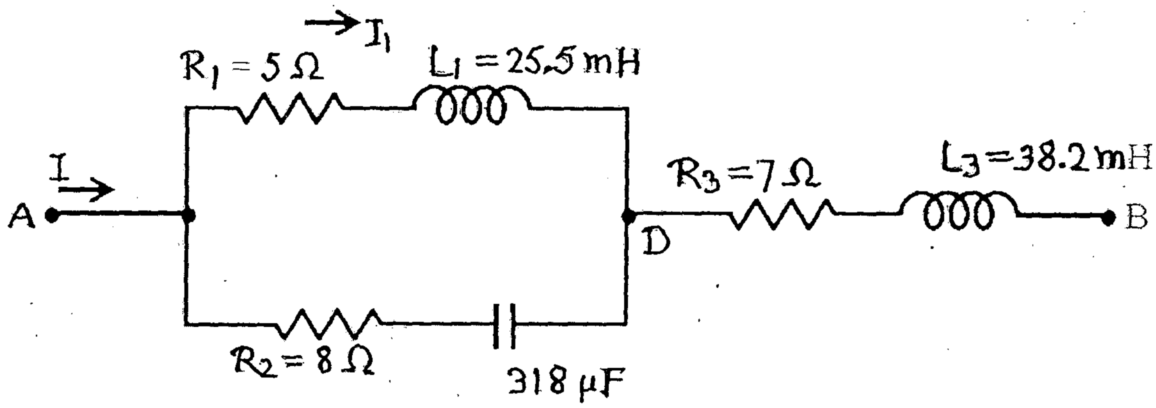

Figure. 2 Circuit diagram for Question no.11

12.a (i) Derive the torque equation of D.C. motor. (4)

(ii) An ideal 25 KVA transformer has 500 turns on the primary winding and 40 turns on the secondary winding. The primary is connected to 3000 V, 50 Hz supply. Calculate (i) primary and secondary currents on full load

(ii) Secondary EMF and

(iii) the maximum core flux. (4+3+3)

Or

12.b. Explain why single phase induction motor is not self starting and the various starting methods of single phase induction motor. (16)

13.a. Obtain C/R using Mason's gain formula (See Figure 3) (16)

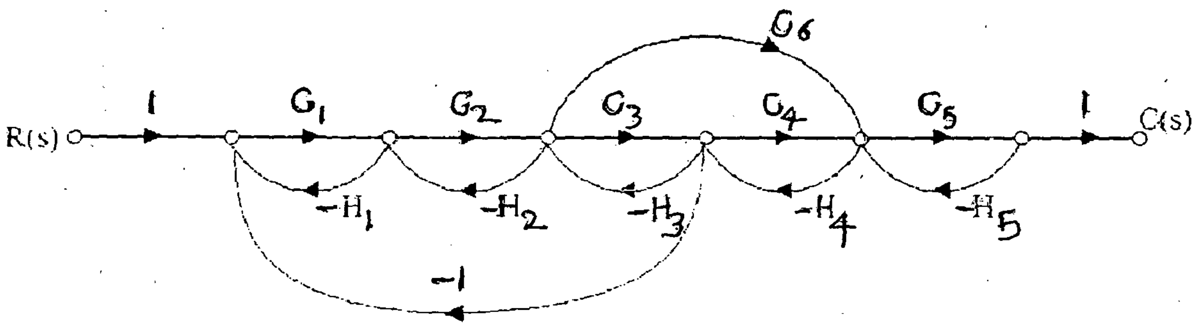

Figure .3 Diagram for Question no.13(a)

Or

13.b Obtain the transfer function $X_2(s)/F(s)$ and $X_1(s)/F(s)$ (See Figure 4) (16)

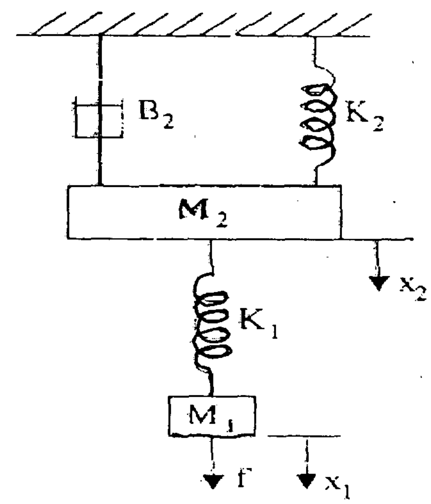

Figure 4 Diagram for Question no.13(b)

14.a. Draw the bode plot for the given open loop transfer function G(s)H(s) and comment about the stability of the system based on the gain margin and phase margin of the system.

$$G(s)H(s) = \frac{30}{s(1+0.5s)(1+0.08s)}$$ (16)

Or

14.b. The maximum overshoot for a unity feedback control system having its forward path transfer function as $G(s) = \frac{K}{s(1+Ts)}$ is to be reduced from 60% to 20 %. The system input is a unit step function. Determine the factor by which K should be reduced to achieve aforesaid reduction. Find the transfer function also. (12+4)

15.a A **230V, 50Hz** a.c. supply is applied to a coil of 1 **mH** inductance and **25 Ω** resistance connected in series with a **10 μF** capacitor. Calculate **impedance, current, power factor angle, power factor and power consumed.** [4+4+2+2+4]

OR

15.b (i) Find I_3 using thevenin's theorem. (Figure .5) (10)

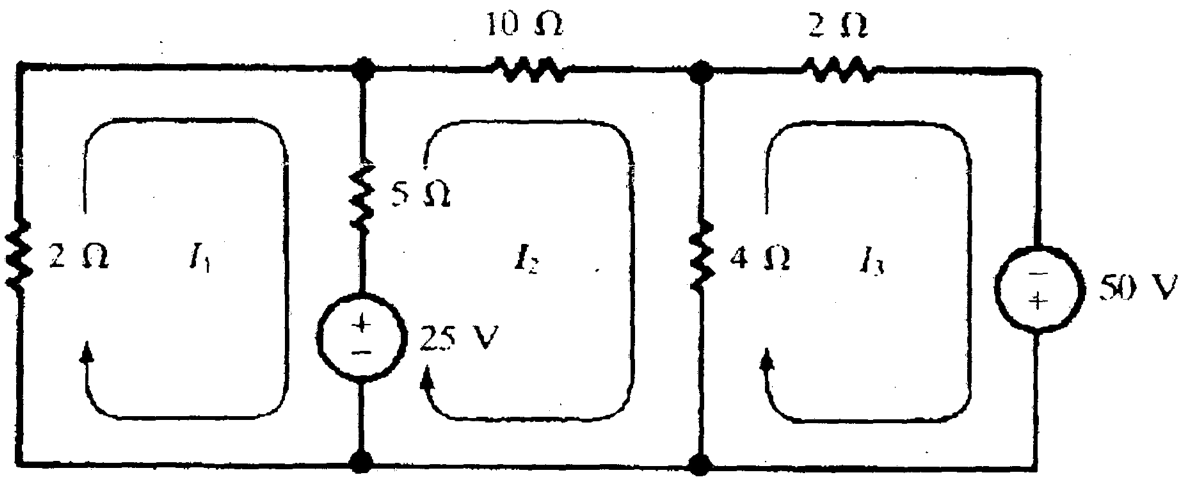

Figure .5 Circuit diagram for Question No. 15.b (i).

15.b.(ii). Obtain all the currents for the circuit shown in Figure 6. Using nodal analysis (6)

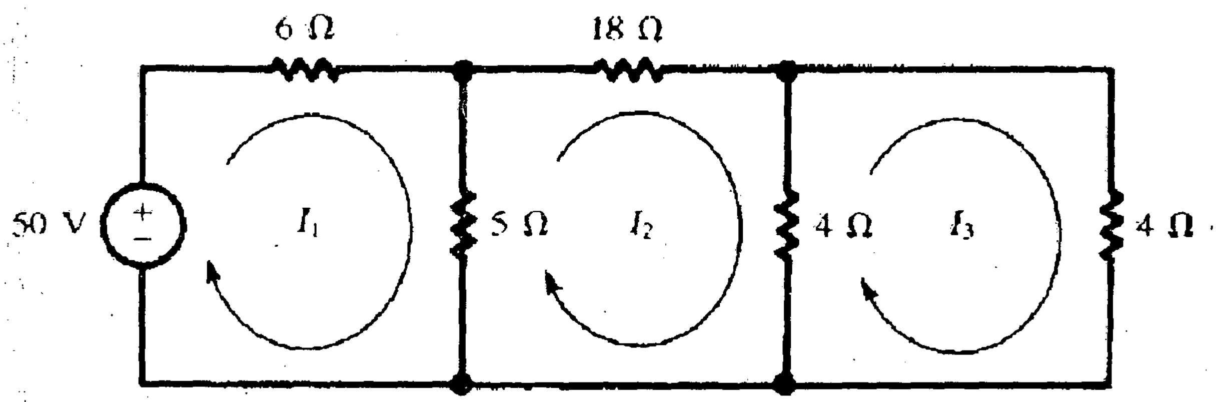

Figure .6 Circuit diagram for Question No. 15.b (ii).