

International Islamic University Chittagong (IIUC)
Department of Electronic and Telecommunications Engineering
Final Examination, Spring- 2022

Course Code: EEE-1121
Full Marks: 50

Course Title: Electrical Circuit-I DC
Time: 2 Hours 30 Minutes

(Figures in the margin indicate full marks)

Group-A

[Answer any two sets of the following questions]

1. (a) Using super node Find v and i in the circuit of Fig.1.

5 CO2

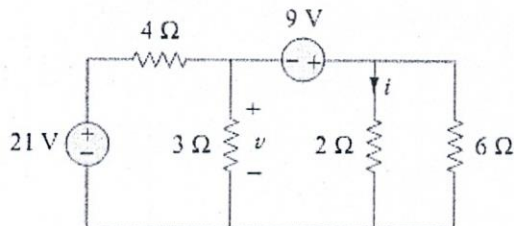


Figure 1

- (b) Use mesh analysis to determine I_o in Fig. 2.

5 CO2

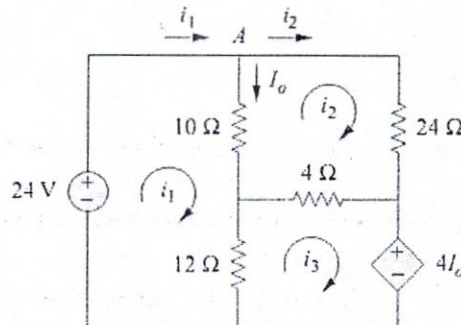


Figure 2

2. (a) Use source transformation to find v_o in the circuit of Fig. 3.

5 CO2

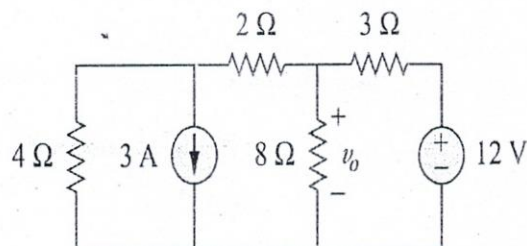


Figure 3

- (b) Using the superposition theorem, find v_o in the circuit of Fig. 4

5 CO2

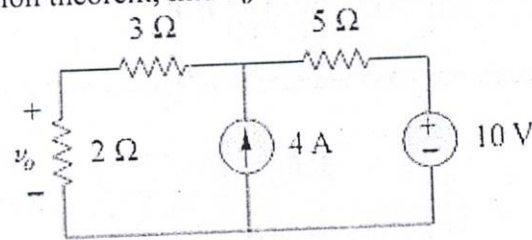


Figure 4

3. (a) Find the Norton equivalent circuit of the circuit in Fig. 5 at terminals a-b.

5 CO2

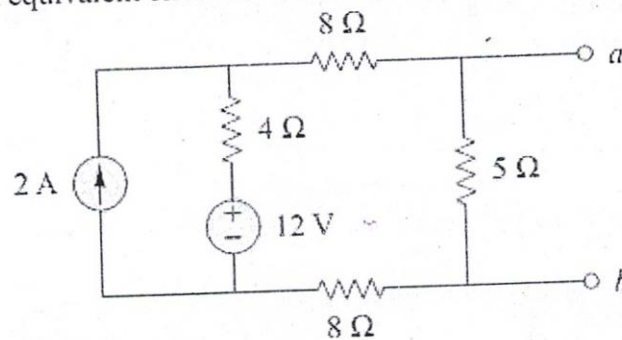


Figure 5

- (b) Find the value of R_L for maximum power transfer in the circuit of Fig. 6. Find the maximum power.

5 CO2

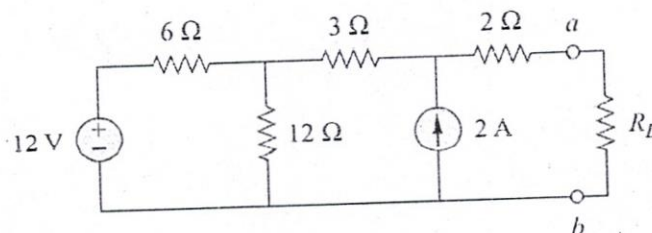


Figure 6

Group-B

[Answer any three sets of the following questions]

4. (a) Determine the *current* through a $200 \mu F$ capacitor whose voltage is shown in Fig. 7.

5 CO2

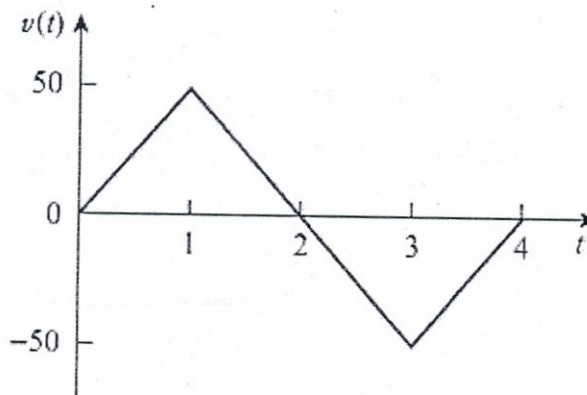


Figure 7

- (b) Determine v_C , i_L , and the energy stored in the capacitor and inductor in the circuit of Fig.8 under dc conditions. 5 CO2

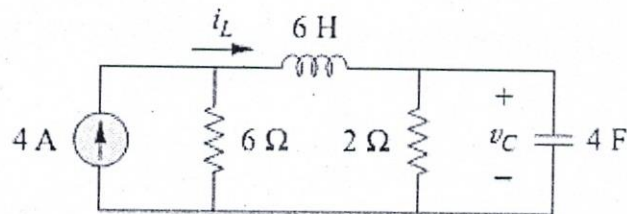


Figure 8

5. (a) The switch in the circuit of Fig. 9 has been closed for a long time. At the $t=0$, switch is opened. Calculate $i(t)$ for $t>0$. 5 CO2

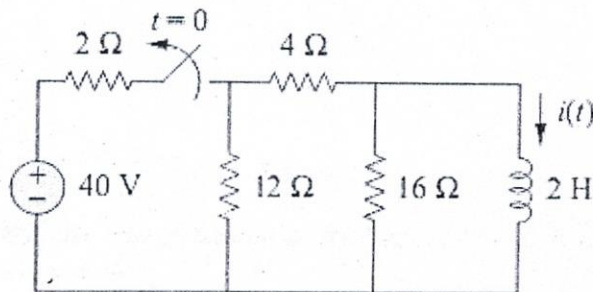


Figure 9

- (b) The switch in Fig. 10 has been in position A for a long time. At $t=0$, the switch moves to B. Determine $v(t)$ for $t>0$ and calculate its value at $t=2$ s and 5 s. 5 CO2

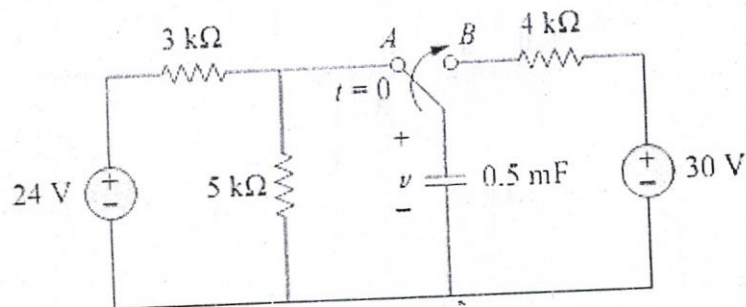


Figure 10

6. (a) Briefly explain first order circuit, second order circuit, overdamped, critically damped and underdamped. 5 CO1
- (b) Find $i(t)$ in the circuit of Fig. 11. Assume that the circuit has reached steady state at $t=0^-$. 5 CO2

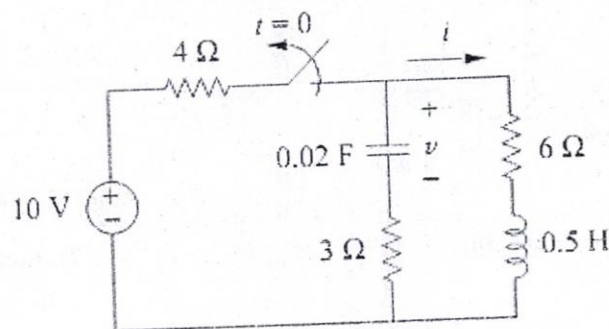


Figure 11

7. (a) Define the terms flux and magnetomotive force. Explain the Ampère's Circuital Law for magnetic circuit. 5 CO1
- (b) Find the value of I required to establish a magnetic $\Phi = 2 \times 10^{-4} \text{ Wb}$ in the series magnetic circuit of Fig. 12. 5 CO2

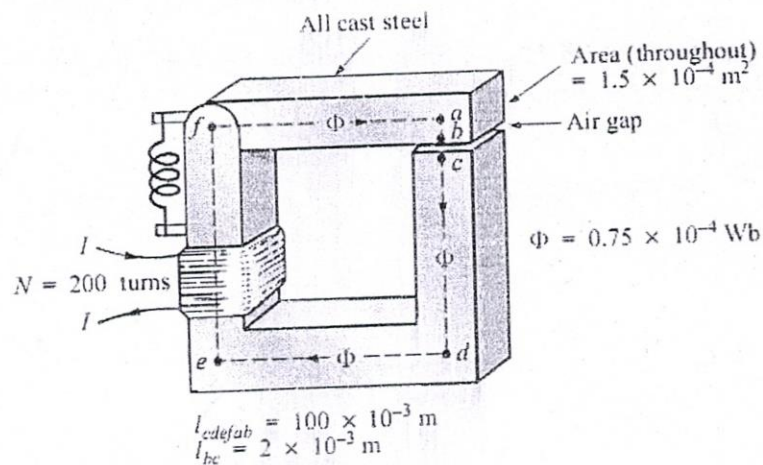
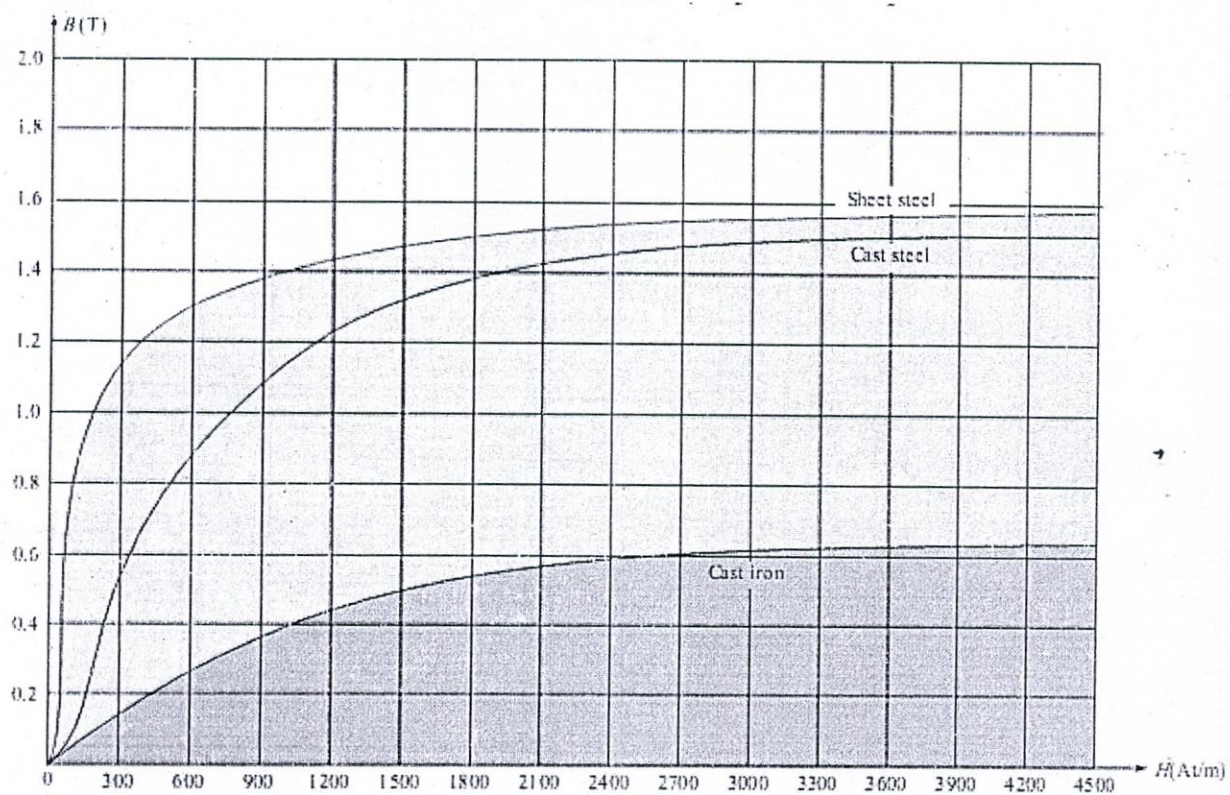
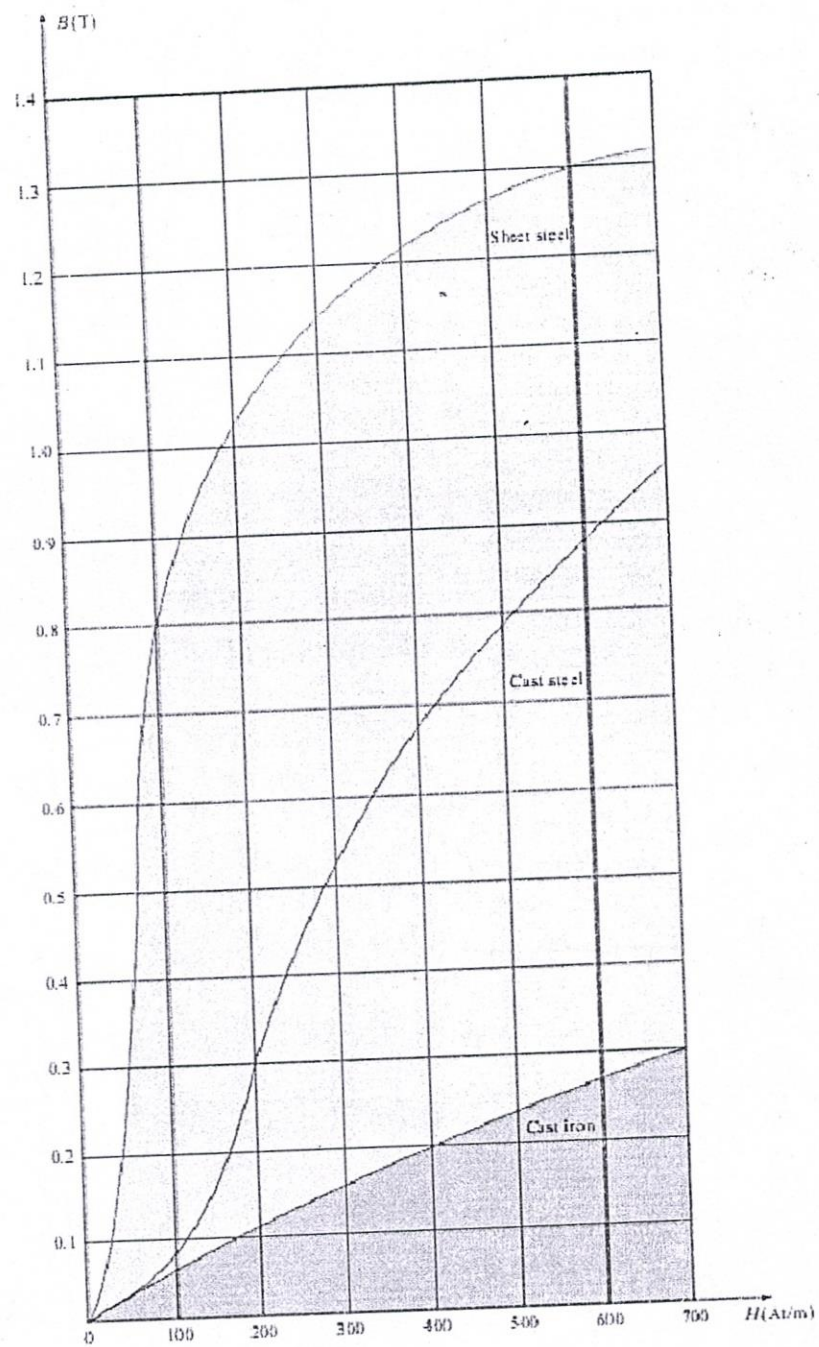


Figure 12



Graph 1



Graph 2