International Islamic University Chittagong
Department of Electrical and Electronic Engineering

Final Examination Autumn-2018	Program: B.Sc. Engg. (EEE)
Course Code: EEE 1101	Course Title: Electrical Circuit-I
Marks: 50	Time: 2 hours 30 minutes

PART-A

[Answer any ***two*** questions from the followings; figures in the right margin indicate full marks.]

1(a). Why source transformation is used in solving some networks? Do you think that source transformation is applicable when an ideal voltage is connected to a network? Justify your comment using simple example. **02**

1(b). Use source conversion technique to find the voltage v_o in the following circuit in **Fig. 1.** **04**

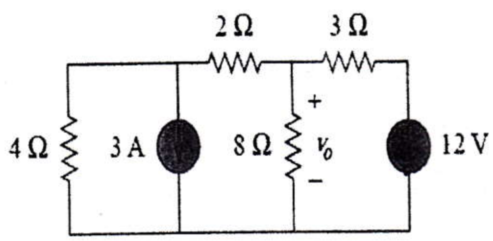


Fig. 1 Figure for question no. 1 (b)

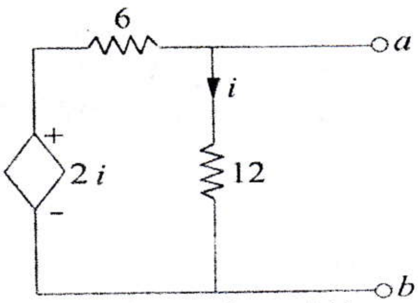


Fig. 2 Circuit for question no. 1 (c)

1(c). Find the Thevenin equivalent circuit for the network shown in **Fig. 2** which contains only a dependent source. Consider the value of the resistors as ohm. **04**

2(a). What is maximum power transfer theorem? Derive the condition for transferring maximum power to the load for a linear bilateral network. **05**

2(b). In the circuit shown in **Fig. 3,** obtain the condition for maximum power transfer to the load R_L and determine the maximum power consumed by R_L (all resistances are in ohm). **05**

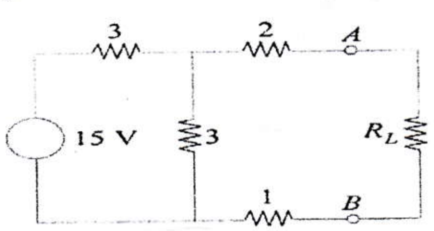


Fig. 3 Circuit for question no. 2 (b)

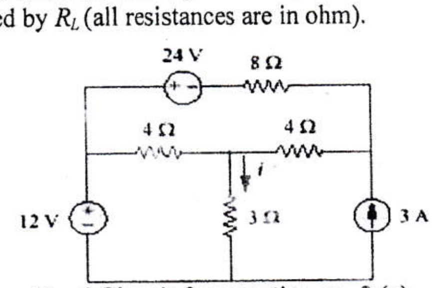


Fig. 4 Circuit for question no. 3 (a)

3(a). State superposition theorem. Find i using superposition theorem from **Fig. 4.** **05**

3(b). Find the Norton equivalent circuit for the network shown in **Fig. 5** at *a-b*. **05**

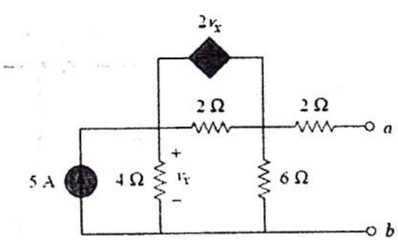


Fig. 5 Circuit for question no. 3 (b)

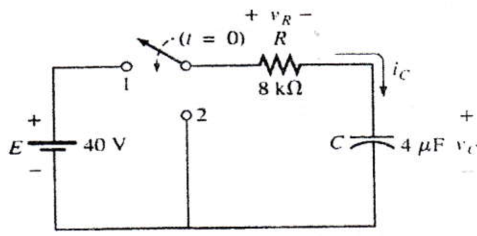


Fig. 6 Circuit for question no. 4 (a)

PART-B

[Answer any ***three*** questions from the followings; figures in the right margin indicate full marks.]

4(a). (i)Find the mathematical expressions for the transient behavior of v_C, i_C, and v_R. for the circuit of **Fig. 6** when the switch is moved to position 1. Plot the curves of v_C, i_C, and v_R (ii)How much time must pass before it can be assumed, for all practical purpose, that $i_C \cong 0$ A and $v_C \cong E$ volts. **05**

4(b). Three capacitors C_1, C_2 and C_3 are connected in series and the corresponding equivalent capacitance is C_s. Derive the equation for C_S. **05**

5(a). Define relative permeability, magnetomotive force, magnetic field intensity and flux density mentioning their units. **04**

5(b). Which section of **Fig. 7** has the largest reluctance to the setting up the flux lines through its longest dimension? And, why? Explain shortly in your own word. **03**

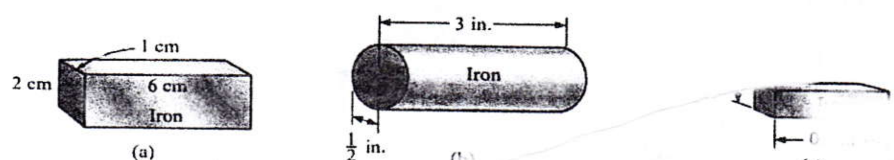


Fig. 7 Circuit for que[illegible] b)

5(c) Classify materials with refer[illegible] magnetic permeability (μ_r). Derive the equation $B = \mu H$; Where [illegible] their usual meaning. **03**

6(a). For [illegible] uit of **Fig. 8** i) Find the value of I required to develop a magn[illegible] = 4 ×10^{-4} Wb. ii) Determine μ and μ_r for the material under these conditions. **05**

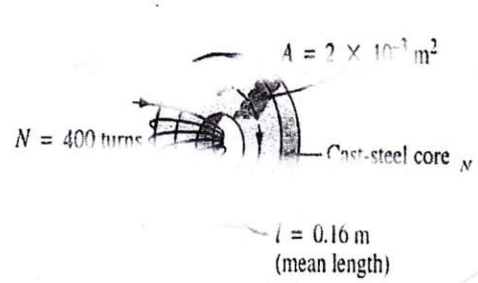
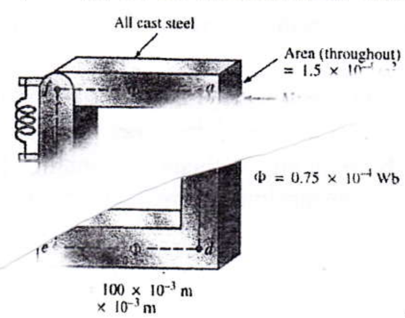


Fig. 8 Figure for question no. 6 [illegible]



[illegible] re for que[illegible]ion no. 6 (b)

6(b). Find the value of I required [illegible] stablish a magn[illegible] flux of Φ [illegible] magnetic circuit of Fi[illegible]

7(a). Find th[illegible] voltag[illegible] across and charge on each capacitor of the [illegible] work of Fi[illegible] after each ha[illegible] up [illegible] value. **05**

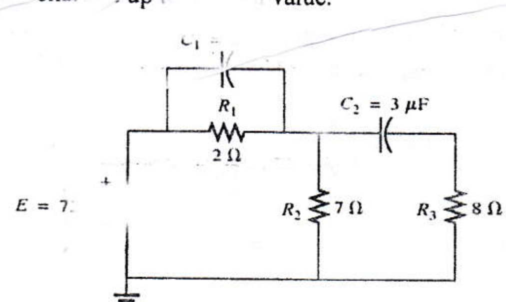


Fig. 10 Figure for question no. 7 (a)

7(b). Describe ampere's circuital law. Compare between magnetic and electric circuits mentioning the analogous variables. **05**