International Islamic University Chittagong
Department of Electrical and Electronic Engineering

Final Examination Spring-2018
Course Code: EEE 1101
Time: 2 hours 30 minutes

Program: B.Sc. Engg. (EEE)
Course Title: Electrical Circuit-I
Full Marks: 50

Part A

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

1(a). Use source conversion technique to find the load current in the following circuit in **Fig.1a**, for the resistor between point A-B. Consider the values of all registers in the circuit in ohm. **05**

1(b). Use superposition theorem to find the current I in the following circuit in **Fig.1b**. Consider the values of all registers in the circuit in ohm. **05**

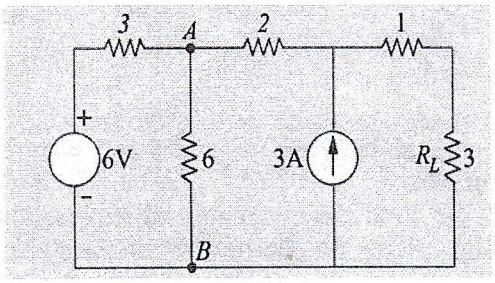


Fig.1a

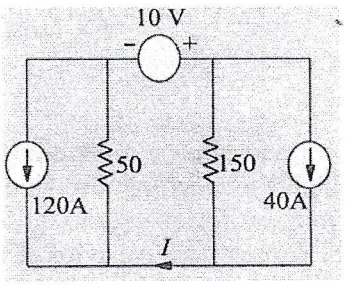


Fig.1b

2(a). State and explain maximum power transfer theorem. Deduce the condition for the maximum power. **04**

2(b). Calculate the value of R in **Fig.2** to be maximum power to load R. **06**

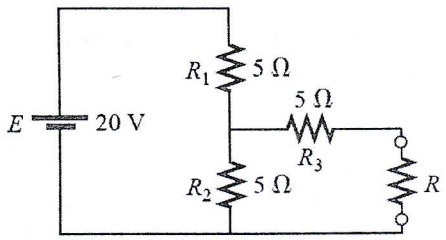


Fig.2

3(a). Find V_{th} and R_{th} between the terminals a-b of the circuit in **Fig.3a**. **05**

3(b). Determine the Norton equivalent network from the given network in **Fig.3b.** **05**

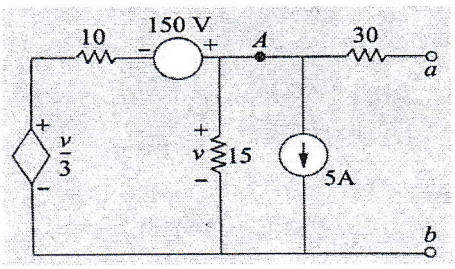


Fig.3a

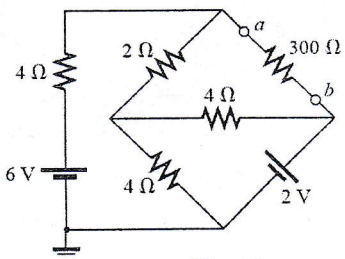


Fig.3b.

Part B

[Answer any ***three*** questions from the followings]

4(a). Three capacitors C_1, C_2 and C_3 are connected in parallel and the corresponding equivalent capacitance is C_P. Derive the equation for C_P. **04**

4(b). Describe the transient behaviors of series R-C circuit for charging and discharging phases with necessary equations, circuit diagrams and curves. **06**

5(a). Define permeability, magnetizing force, hysteresis and flux density. **04**

5(b). Find the magnetic flux φ for the series magnetic circuit in **Fig.4** for the specified impressed mmf. **06**

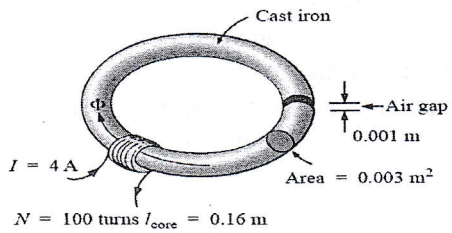


Fig.4

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

6(b). From the following circuit in **Fig.5**. **(i).** Find the mathematical expressions for the transient behavior of V_C, i_C, and V_R for the circuit of 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 purposes, that i_C= 0 A and V_C=E volts? **05**

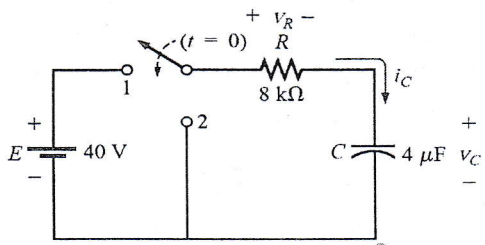
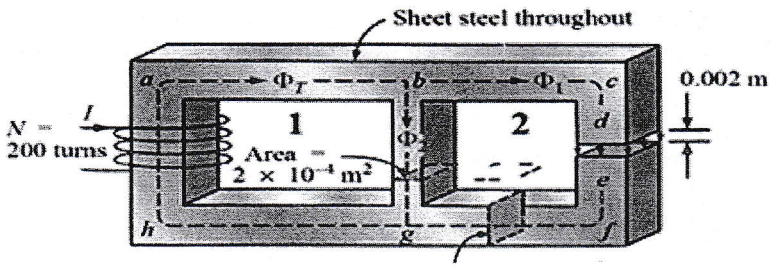


Fig.5

7(a). Derive the expression of energy stored in an inductor. **05**

7(b). For the series-parallel magnetic circuit in **Fig.6**, find the value of I required to establish a flux of φ_g=2 ×10^{-4}Wb in the gap. **05**



Area for sections other than bg=5 × 10^{-4} m^2

l_{ab}= l_{bg}= l_{gh}= l_{ha}=0.2 m; l_{bc}= l_{fg}=0.1m; l_{cd}= l_{ef}=0.099 m

Fig.6