



**Daffodil International University**  
Department of Electrical and Electronic Engineering  
Faculty of Engineering  
**Final-Term Examination, Fall -2024**

Course Code:0713-111

Section: A, B, C, D, E & F

Full Marks: 40

Course Title: Electrical Circuits I

Level-Term: L1-T1

Exam Date: December 17, 2024

Teacher's Initial: MAH, KZ

Time: 2:00 Hours

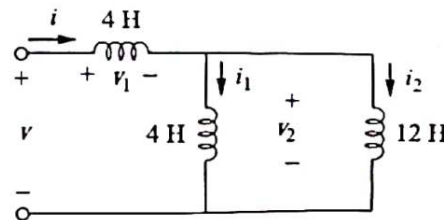
[Notes: Answer all the following questions.

CO's represent one of the learning outcome of the course.

Figures on the right hand side indicate marks allocated for the questions.]

- Q1(a)** For the circuit in Fig.1,  $i(t) = 4(2 - e^{-10t})$  mA. If  $i_2(0) = -1$  mA, find: (a)  $i_1(0)$ ; (b)  $v(t)$ ,  $v_1(t)$ , and  $v_2(t)$ ; (c)  $i_1(t)$  and  $i_2(t)$

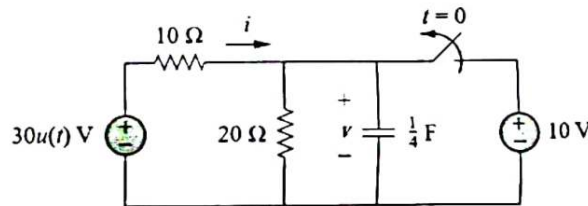
**Marks**  
CO-3 [5]  
(C4)



**Fig.1**

- (b)** In Fig.2, the switch has been closed for a long time and is opened at  $t = 0$ . Find  $i$  and  $v$  for all time.

CO-3 [5]  
(C4)



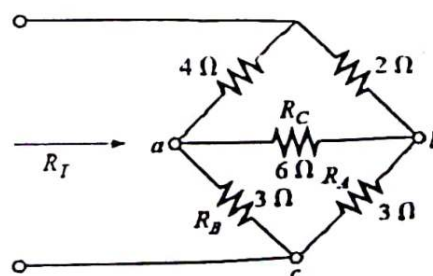
**Fig.2**

- Q2(a)** Prove the conversion:  $R_\Delta = 3R_Y$ .

CO-2 [5]  
(C3)

- (b)** Find the total resistance of the Fig.3 where  $R_A = 3\Omega$ ,  $R_B = 3\Omega$ , and  $R_C = 6\Omega$ .

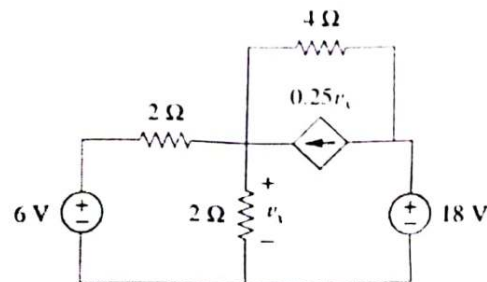
CO-2 [5]  
(C3)



**Fig.3**

**Q3(a) Find  $V_x$  in Fig.4 using source transformation.**

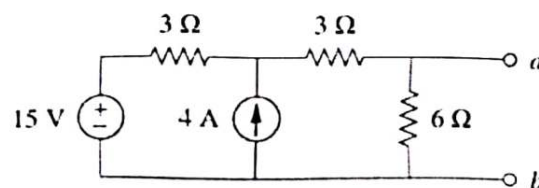
CO-2 [5]  
(C3)



**Fig.4**

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

CO-2 [5]  
(C3)



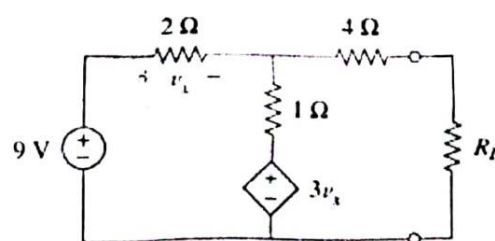
**Fig.5**

**Q4(a) Prove that maximum power is transferred to the load when the load resistance equals the Thevenin resistance as seen from the load ( $R_L = R_{TH}$ ) and also find the equation of maximum power delivered to the load.**

CO-2 [5]  
(C3)

**(b) Determine the value of  $R_L$  that will draw the maximum power from the rest of the circuit in Fig.6. Calculate the maximum power.**

CO-2 [5]  
(C3)



**Fig.6**

*$R_L = R_{th}$  then the equation of max. power*