Daffodil International University

Department of Electrical and Electronic Engineering

Faculty of Engineering

Final-Term Examination, Fall -2024

Course Code:0713-111	Course Title: Electrical Circuits I	
Section: A, B, C, D, E & F	Level-Term: L1-T1	Teacher's Initial: MAH, KZ
Full Marks: 40	Exam Date: December 17, 2024	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.]

			Marks
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 $i_2(t)$	CO-3 (C4)	[5]

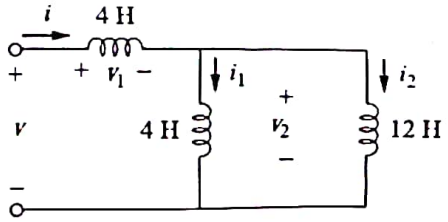

Fig.1

(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 (C4)	[5]

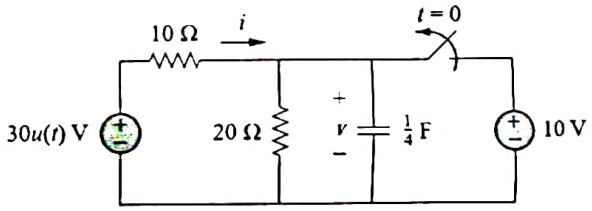

Fig.2

Q2(a)	**Prove** the conversion: $R_\Delta = 3R_Y$.	CO-2 (C3)	[5]
(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 (C3)	[5]

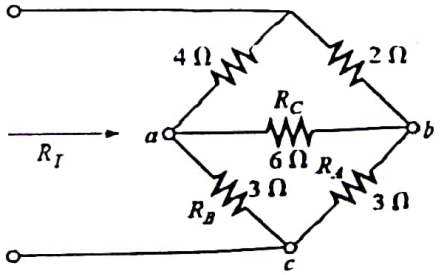

Fig.3

Q3(a) **Find** V_x in Fig.4 using source transformation. CO-2 (C3) [5]

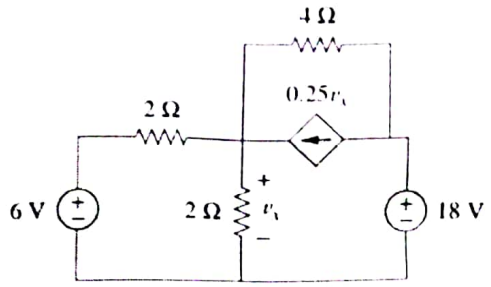

Fig.4

(b) **Find** the Norton equivalent circuit for the circuit in Fig.5 at terminals a-b. CO-2 (C3) [5]

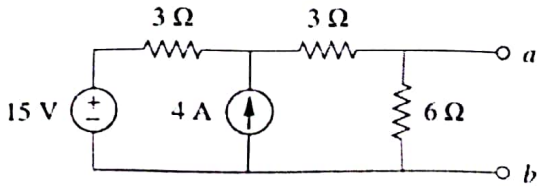

Fig.5

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 (C3) [5]

$R_L = R_{th}$ then, the equation of ...

(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 (C3) [5]

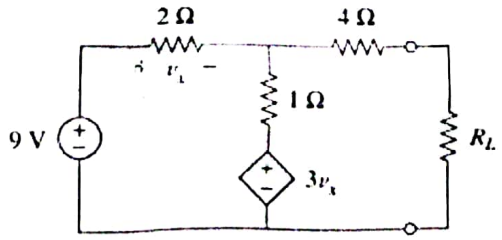

Fig.6