International Islamic University Chittagong (IIUC)

Department of Electronic and Telecommunication Engineering Final Examination

Program: B.sc (Engg.)
Course Code: ETE-1121

Total Marks: 50

Semester: Autumn 2022
Course Title: Electrical Circuit I DC

Time: 2 Hours 30 Minutes

(i) Answer all the questions. The figures in the right-hand margin indicate full marks.

(II) Course Outcomes (C	cos) and	d Bloom	's Levels	are mei	ntioned ir	n additional (Columns.
ACCUMANTAL AND ACCUMANTA AND ACCUMANTAL AND ACCUMAN	STATISTICAL PROPERTY.		THE RESERVED IN STREET	THE REAL PROPERTY AND PERSONS ASSESSED.	CARROL MANAGEMENTS AND AND AND AND ADDRESS.		PARTY HAVE DESIGNATION OF

	Course Outcomes (COs) of the Questions
CLO 1	Understand the concepts of basic Circuit element, basic circuit, and basic circuit Laws and magnetic circuit laws.
CLO 2	Introduce series parallel circuit and different network theorem to analysis the circuits.
PARTITIONAL	Bloom's Levels of the Questions
4 4	Letter Symbols D II An An F

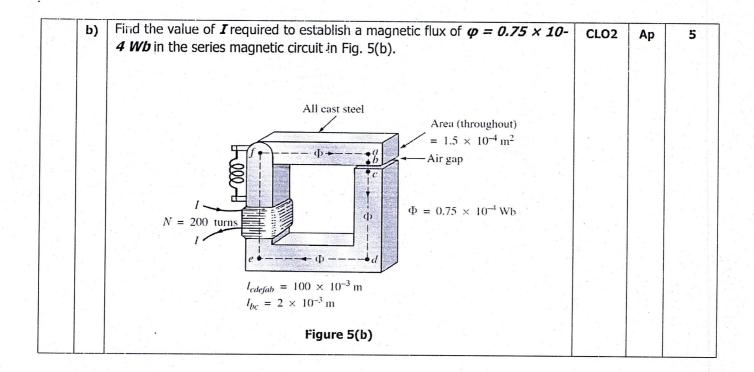
	Diooni S Lev	els of the Qu	estions			
Letter Symbols	R	U	Ap	An	E	, C
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

		PART A			
Q1	a)	"Wodal analysis, which is based on a systematic application of Kirchhoff's current law (KCL), and mesh analysis, which is based on a systematic application of Kirchhoff's voltage law (KVL)" Is above statement true? Justify the Statement. Also explain the terms "super node" and "super Mesh".	CLO2	Е	5
	b)	Use <i>mesh analysis</i> to obtain <i>i_o</i> in the circuit of <i>Fig. 1(b)</i> .	CLO2	Ap	5
		6 V			
		$2\Omega \geqslant \underbrace{i_o 1\Omega}_{\text{WW}} \geqslant 4\Omega$	**************************************	The contribution	
		5 Ω \(\begin{align*} \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			
		Figure 1(b)			
+		OR			

C. J. W. in the circuit of Fig. 1(b)	CLO2	Ар	5
Using <i>nodal analysis</i> , find V_o in the circuit of <i>Fig. 1(b)</i>			
5 A			
2Ω 8Ω			
1Ω ξ +			
$v_o \gtrsim 4 \Omega$ $+ 20 V$			
40 V (+)			
40 1			
Figure 1(b)			
a) Find i_o in the circuit of <i>Fig. 2(a)</i> using <i>source transformation</i> .	CLO2	Ap	5
계약 등에 여렇게 되어가는 아이 모든 모든 모든 사람들이 되는 것이 없어 되어 되었다.			
5 V 1Ω			
$6\Omega \stackrel{>}{\leqslant} 5A \stackrel{\frown}{\downarrow} 3\Omega \stackrel{>}{\leqslant} 7\Omega \stackrel{>}{\leqslant} 3A \stackrel{\frown}{\downarrow} 4\Omega \stackrel{>}{\leqslant}$			
		2 10.	
Figure 2(a)			
b) Find the value of R_L for maximum power transfer in the circuit of Fig. 2(b)	<i>).</i> CLO2	Ap	5
Find the <i>maximum power</i> .			1-1-1
6Ω 3Ω 2Ω a			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			
$12 \text{ V} \stackrel{+}{\leftarrow} $			
b			
Figure 2(b)			
rigure 2(b)			
OR			

	Find the Norton equivalent circuit for the circuit in Fig. 2(b) , at terminals a-b.	CLO2	Ар	5
	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			
	Figure 2 (b)			
	PART B			
a)	"The equivalent capacitance of series-connected capacitors is the reciprocal of the sum of the reciprocals of the individual capacitances" Prove the statement.	CLO2	E	5
b)	In Fig. 3(b) , let $v_c(0) = 15$. V Find v_c , v_x , and i_x for $t>0$.	CLO2	Ар	5
	$ \begin{array}{c c} 8 \Omega \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ $			
			8 5 5 C	
*	OR			
	Find <i>i(t)</i> in the circuit of <i>Fig. 3(b)</i> for <i>t>0</i> . Assume that the switch has been closed for a long time.	CLO2	Ар	5
	t=0			
	$\begin{array}{c c} 2\Omega & 3\Omega \\ \hline \\ \end{array}$			
: : :	10 V (+) (3 \frac{1}{3} H)			
	Figure 3(b)			
		Figure 2 (b) PART B a) "The equivalent capacitance of series-connected capacitors is the reciprocal of the sum of the reciprocals of the individual capacitances" Prove the statement. b) In Fig. 3(b), let $v_c(0) = 15$. V Find v_c , v_x , and i_x for $t > 0$. 8 Ω Figure 3(b) OR Find $i(t)$ in the circuit of Fig. 3(b) for $t > 0$. Assume that the switch has been closed for a long time. $t = 0$ 2Ω 3Ω 3Ω $4 A$ 5Ω 5Ω 6Ω 6Ω 7Ω 8Ω 7Ω 7Ω 9Ω 9Ω 9Ω 10Ω 10Ω 10Ω 10Ω	Figure 2 (b) PART B a) "The equivalent capacitance of series-connected capacitors is the reciprocal of the sum of the reciprocals of the individual capacitances" Prove the statement. b) In Fig. 3(b), let $v_c(0) = 15$ N Find v_c , v_{xx} and i_x for $t > 0$. CLO2 8 Ω Figure 3(b) OR Find $i(t)$ in the circuit of Fig. 3(b) for $t > 0$. Assume that the switch has been closed for a long time. $i = 0$ Ω Ω Ω Ω Ω Ω Ω	PART B a) "The equivalent capacitance of series-connected capacitors is the reciprocal of the sum of the reciprocals of the individual capacitances" Prove the statement. b) In Fig. 3(b), let $v_c(0) = 15$. V Find v_c , v_x , and i_x for $t > 0$. SQ OILF $v_c = 12 \Omega v_x$ Figure 3(b) OR Find $i(t)$ in the circuit of Fig. 3(b) for $t > 0$. Assume that the switch has been closed for a long time.

4	a)	The switch in <i>Fig. 4(a)</i> has been closed for a long time. It is open at $t=0$. Find: (i) $i(0^+)$, $v(0^+)$ (ii) $di(0^+)/dt$, $dv(0^+)/dt$ (c) $i(\infty)$, $v(\infty)$.	CLO2	Ар	5
		$4\Omega = 0.25 H$			
		$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			
		Figure 4(a)			
	b)	Find $i(t)$ in the circuit of Fig. 4(b) . Assume that the circuit has reached steady state at $t=0$.	CLO2	Ар	5
		$ \begin{array}{c c} 4 \Omega & t = 0 \\ \hline 0.02 F & \nu \\ \hline 3 \Omega & 3 0.5 H \end{array} $			
		$0.02 \text{ F} \stackrel{+}{=} \stackrel{v}{{=}} \stackrel{\gtrless}{{=}} 6 \Omega$			
		3 Ω \$ 0.5 H			
		Figure 4(b)			
		OR			
_		For the circuit in Fig. 4(b), find $v(t)$ and $i(t)$ for $t>0$. Consider $R=4$ Ω .	CLO2	Ap	5
		$R \qquad 1 \text{ H} \qquad t = 0$ $i \qquad \qquad + \qquad \qquad $			
		Figure 4(b)			
		Explain the terms "flux" and "magnetic force." Also Briefly Explain	CLO1	U	5



Appendix:

