

Sir Syed University of Engineering & Technology

ANSWER SCRIPT

Date:	19 jan 2020
Roll Number:	2016-CE-026
Section:	A
Name:	Farhan rehman
Course Name:	Basic Electrical Engineering
Degree Program:	BSCE
Total number of pages being submitted:	

Start writing from here ...

Date

$$-2V_A - 30 - 50 = 0$$

$$V_A = -40V$$

$$V = IR$$

$$= I_1 R_1$$

$$I_1 = \frac{V}{R_1}$$

$$= \frac{-40}{1k}$$

$$I_1 = \frac{-40}{1000}$$

$$I_1 = 40mA$$

$$I_2 = \frac{-40}{1k\Omega}$$

$$I_2 = 40mA$$

$$I_3 = \frac{30+40}{1000}$$

$$= \frac{70}{1000}$$

$$I_3 = 7mA$$

$$I_4 = \frac{30}{526}$$

$$I_4 = 5mA$$

$$I_5 = \frac{30}{2000}$$

$$I_5 = 1.5mA$$

$$I_6 = \frac{30+40}{1k}$$

$$I_6 = 7mA$$

RC

No.

$$I_1 - I_2 - I_3 = 0$$

$$\frac{V_B}{2k\Omega} - 30mA + \frac{V_B}{2k\Omega} = 0$$

$$V = IR$$

$$I = \frac{V}{R}$$

$$\frac{V_B}{2k\Omega} - 30mA - \frac{V_B}{2k\Omega} = 0$$

$$\frac{V_B}{2k\Omega} + \frac{V_B}{2k\Omega} - 30mA = 0$$

$$V_B + V_B - 60mA = 0$$

$$2V_B - 60mA = 0 \rightarrow \textcircled{2}$$

$$V_B = \frac{60}{2}$$

$$V_B = 30V$$

Put in eq ①

Date _____

$$I_4 - I_5 - I_6 = 0$$

$$\frac{V_B}{2k\Omega} - 30mA + \frac{V_B}{2k\Omega} = 0$$

$$V = IR$$

$$I = \frac{V}{R}$$

$$\frac{V_B}{2k\Omega} - 30mA - \frac{V_B}{2k\Omega} = 0$$

$$\frac{V_B}{2k\Omega} + \frac{V_B}{2k\Omega} - 30mA = 0$$

$$V_B + V_B - 60mA = 0$$

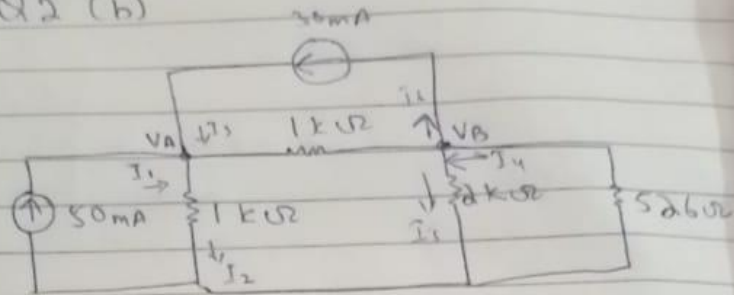
$$2V_B - 60mA = 0 \rightarrow \textcircled{2}$$

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RC

Date

Q2 (b)



Find current??

$$I_1 - I_2 - I_3 = 0$$

$$50\text{mA} - \frac{(V_A - 0)}{1\text{k}\Omega} - \frac{V_A - V_B}{1\text{k}\Omega} = 0$$

$$50 - \frac{V_A}{1\text{k}} - \frac{V_A - V_B}{1\text{k}} = 0$$

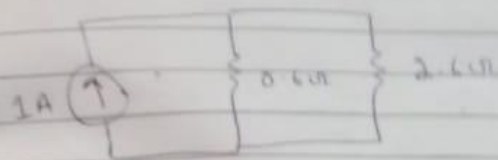
$$50 - V_A - V_A - V_B = 0$$

$$50 - 2V_A - V_B = 0$$

$$\boxed{-2V_A - V_B = -50} \rightarrow 1$$

RC

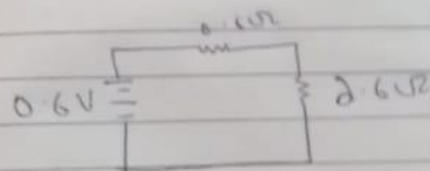
No.



$$V = IR$$

$$V = 1 \times 0.6 \text{ V}$$

$$V = 0.6 \text{ V}$$



$$I_L = \frac{0.6}{0.6 + 2.6}$$

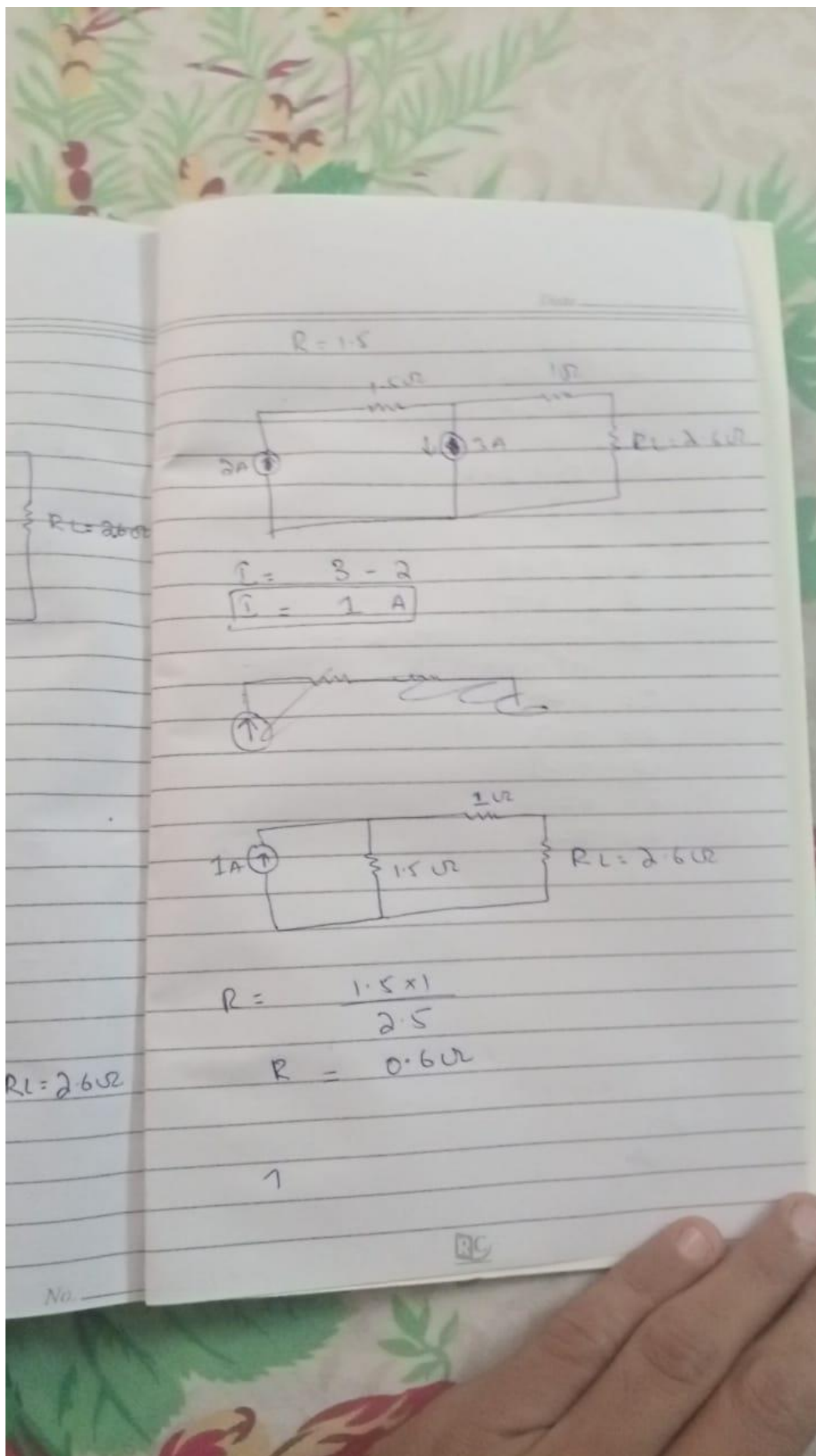
$$I_L = \frac{0.6}{3.2}$$

$$I_L = 0.18 \text{ A}$$

Answer



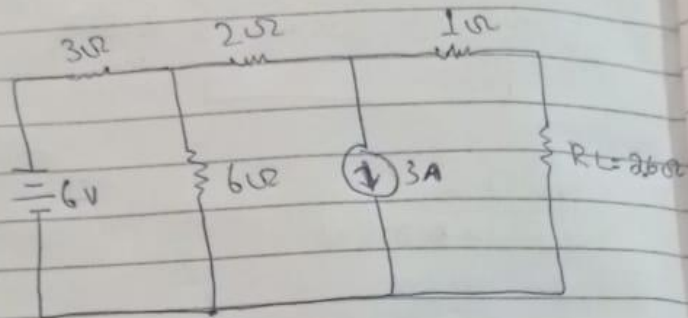
No



Date _____

(d2) (b)

2(a)



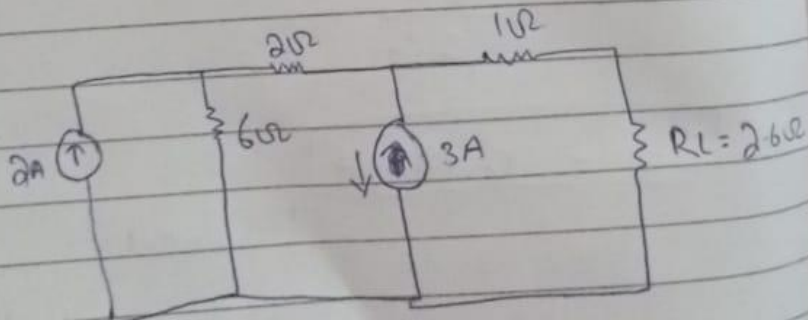
find $I_L = ?$

$$V = I R$$

$$I = \frac{V}{R}$$

$$= \frac{6}{3}$$

$$I = 2A$$



$$R = \frac{2 \times 6}{8} = \frac{12}{8}$$

RC

No. _____

Q1

Given data
output power = 80W
current $I = 3A$
Voltage = 40V

① $\eta = ?$

So $P_{in} = \cancel{1 \times V} \times V$
 $= 3 \times 40$
 $= 120W$

So $\eta = \frac{P_{out}}{P_{in}}$

$= \frac{80}{120}$

$\eta = 0.66$

$$\begin{array}{r} .66 \\ 3 \overline{) 20} \\ \underline{18} \\ 20 \\ \underline{18} \end{array}$$

In % $\eta = 66\%$

maximum Power

$$\frac{dP}{dR_L} = 0$$

$$\frac{dP}{dR_L} \left(\frac{V^2 R_L}{(R_{TH} + R_L)^2} \right) = 0$$

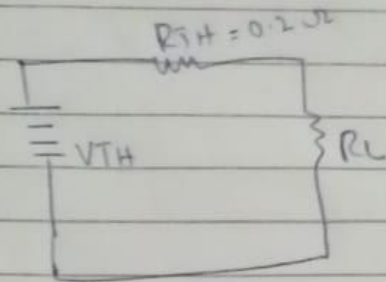
$$\therefore \frac{V^2 [R_L \cdot 2(R_{TH} + R_L) - (R_{TH} + R_L)^2 \cdot 1]}{(R_{TH} + R_L)^4} = 0$$

$$R_L^2 - R_{TH}^2 = 0$$

$$R_L = R_{TH}$$

Date: _____

Question 3(A)



P_{max}

$$R_L = R_{TH}$$

According to question

$$R_L = 0.2 R_{TH}$$

$$I = \frac{V_{TH}}{R_{TH} + R_L}$$

Power

$$P = VI$$
$$= I^2 R_L$$

$$P = \frac{V^2 \cdot R_L}{(R_{TH} + R_L)^2}$$

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Find Norton I

$$V_S = V_1 + I_N R = \frac{V_1}{R}$$

$$V_1 = 13.5V$$

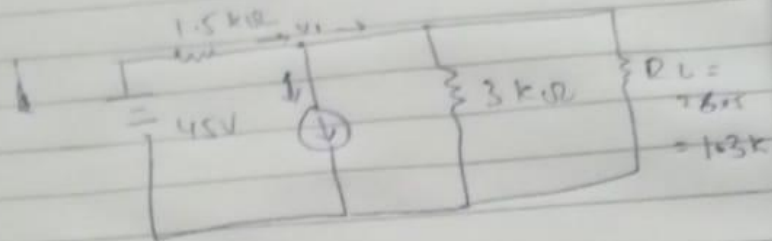
$$I = \frac{V_1}{R} = \frac{13}{1.5}$$

$$I_N = 8.5A$$

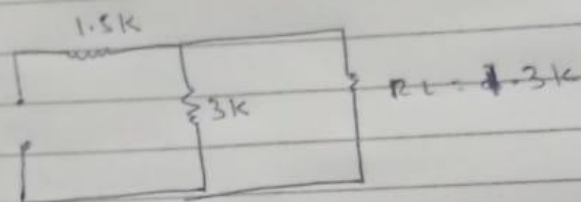
$$I_L = \frac{R_N}{R_N + R_L} I_N$$

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Q 2 (b)



Solution



$$= \frac{1.5 \times 3}{3 + 1.5}$$

$$= \frac{4.5}{4.5}$$

$$R_{TH} = 1k$$

RC

No. _____

