European University of Bangladesh

2/4 Gabtoli, Mirpur, Dhaka 1216.

Admit Card

Name of Exam : **Final Exam Summer 2021**
Semester : **Summer 2021**
Student's Name : **Shemol Chandra Roy**
Student's ID : **210122009**
Batch : **18th Batch**
Program : **BSc in Computer Science & Engineering (Diploma)**

Courses in which to appear at:

SL	Course Title	Course Code	Credit
1	Discrete Mathematics [A]	CSE-123	3
2	Introduction to Electrical Engineering [A]	EEE-101	3
3	Physics [A]	PHY-101	3
4	Introduction to Electrical Engineering Sessional [A]	EEE-102	1.5
5	Mathematics-II (Ordinary and Partial Differential Equations) [A]	MTH-103	3
6	Physics Sessional [A]	PHY-102	1.5

S/he is allowed to sit for the above mentioned exam.

[Digitally Signed]

Controller of Examinations (EUB)

Instructions for Examinees:

1. Examinee should come to the examination hall with the Admit Card.
2. No examinee will be allowed to sit in the examination hall outside the seat plan.
3. No bag or book will be allowed in the examination hall.
4. Cell Phone must be kept switched off in the examination hall.
5. No examinee will be allowed to enter the examination hall after expiry of half an hour.
6. No examinee will be allowed to leave the exam hall within the first half an hour after the examination begins.
7. Any examinee adopting unfair means will be brought under disciplinary action including expulsion.
8. Any kind of misbehavior will be considered as a serious offence under the rules of the University.

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European Uriversity of Bangladesh
2/4 Grabtolè, Mirpur, Dhaka-1216

Final Exam Summer - 2021

Name : Shemol chandra Roy
ID : 210122009
Program : BSC in computer science and Engineering (Eve)
Course Title : Introduction to Electrical Engineering
Course Code : EEE-101
Section : A
Semester and year: 2nd year 1st Semesten
Date : 21/06/2021
Total page no : 07

§ 2020122009

Ans to the question no: 1

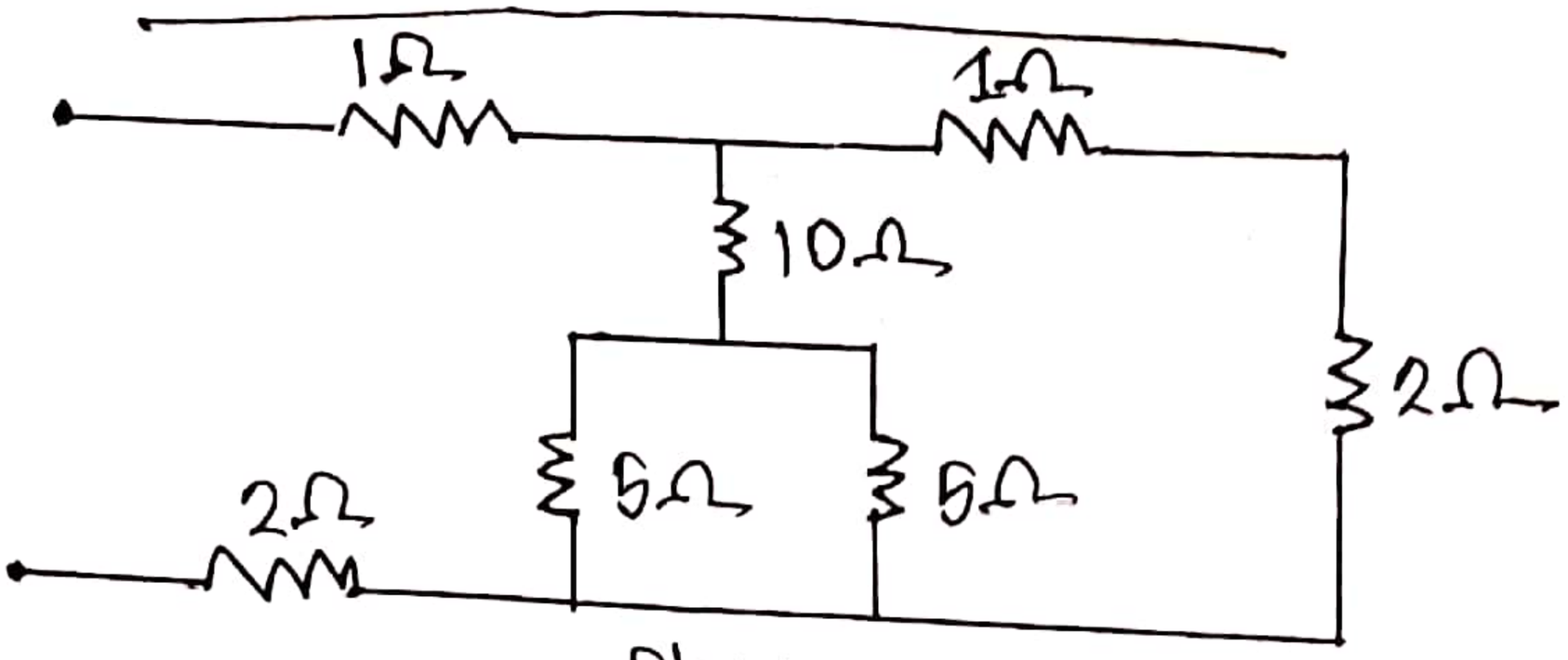


Fig:1

The 1Ω and 2Ω resistors are in series.

$\therefore 1\Omega + 2\Omega = 3\Omega$

The 5Ω and 5Ω resistors are in parallel

$\therefore 5\Omega \| 5\Omega = \frac{5\times5}{5+5} = 2.5\Omega$

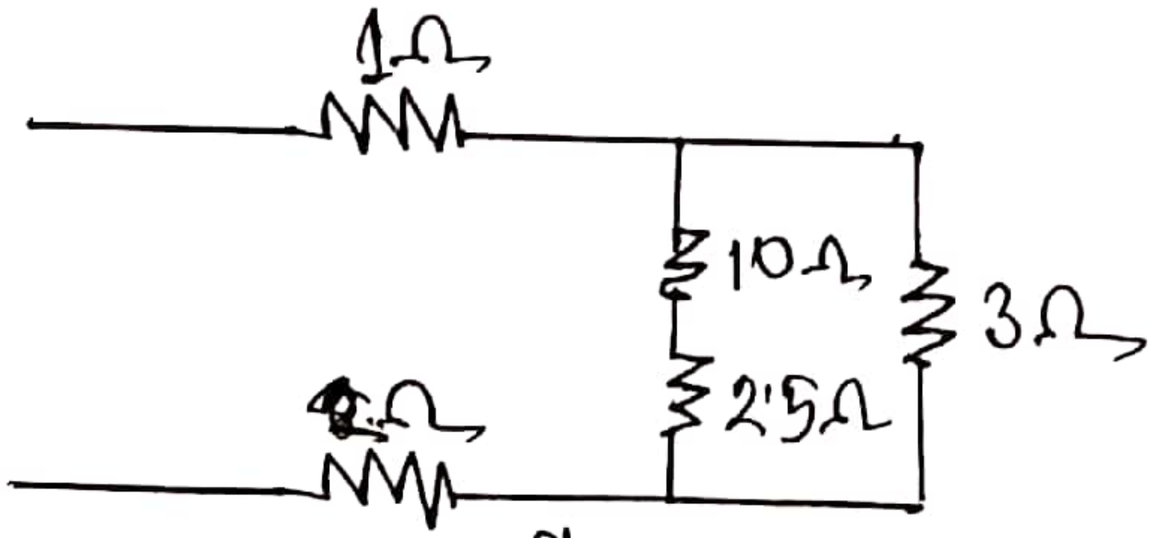


Fig:2

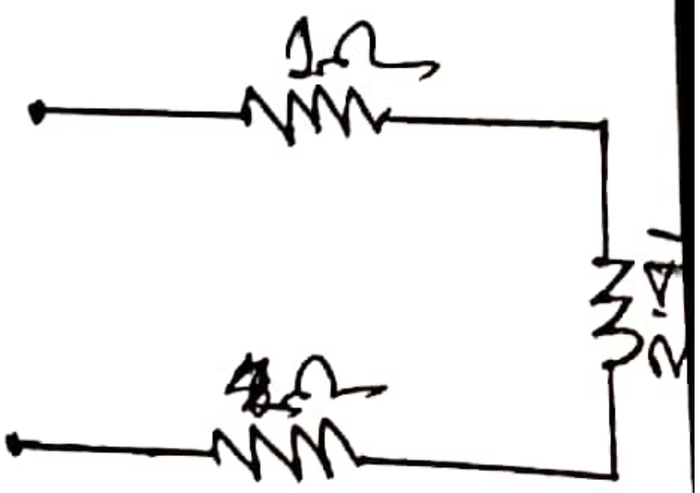


Fig:3

The 10Ω and 2.5Ω resistors are in series

$10\Omega + 2.5\Omega = 12.5\Omega$

The 12.5Ω and 3Ω resistance are in parallel

~~10Ω \|\| 2~~ $12.5\Omega \| 3\Omega = \frac{12.5\times3}{12.5+3} = 2.41$

In Fig(3) the three resistance are series. Here the equivalent resistance for the circuit is

$R_{eq} = 1\Omega + 2.41\Omega + 2\Omega$

$= 5.41\Omega$ Ans.

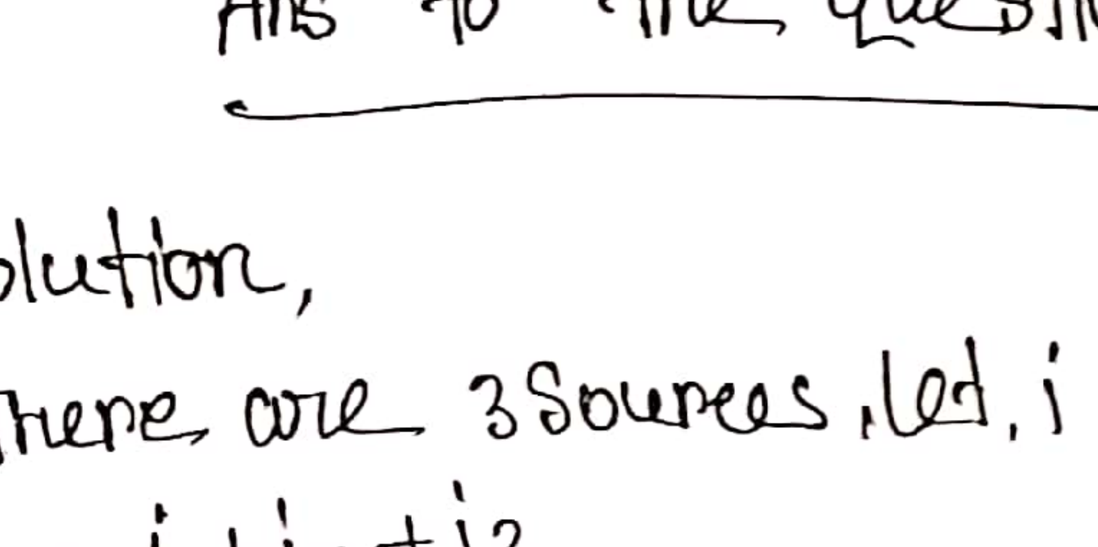
Ans to the question no: 2

Solution,

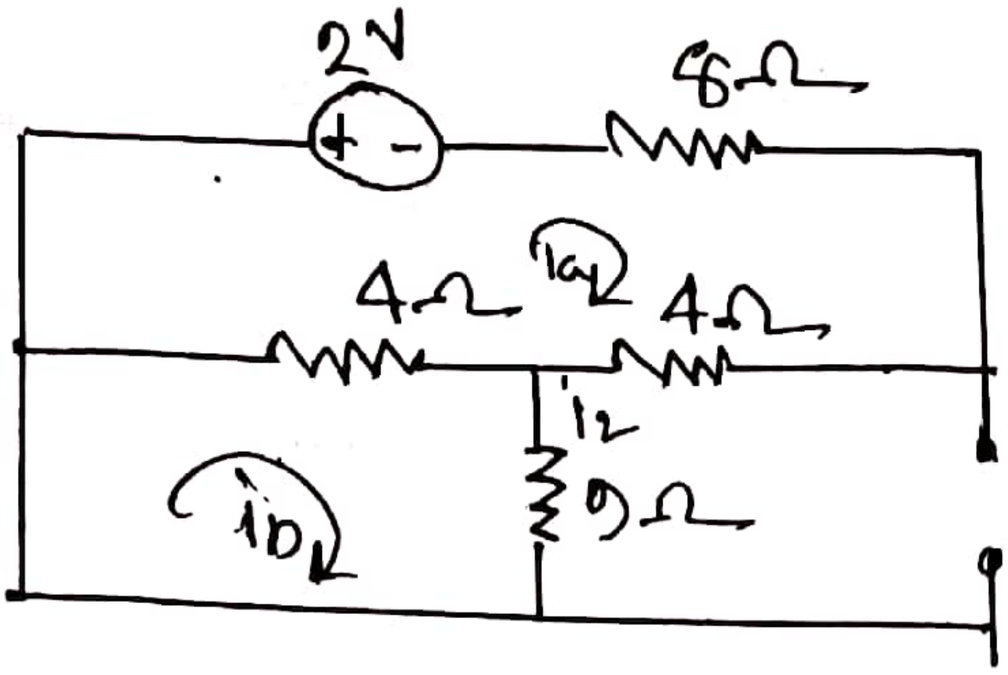
There are 3 Sources, let, i

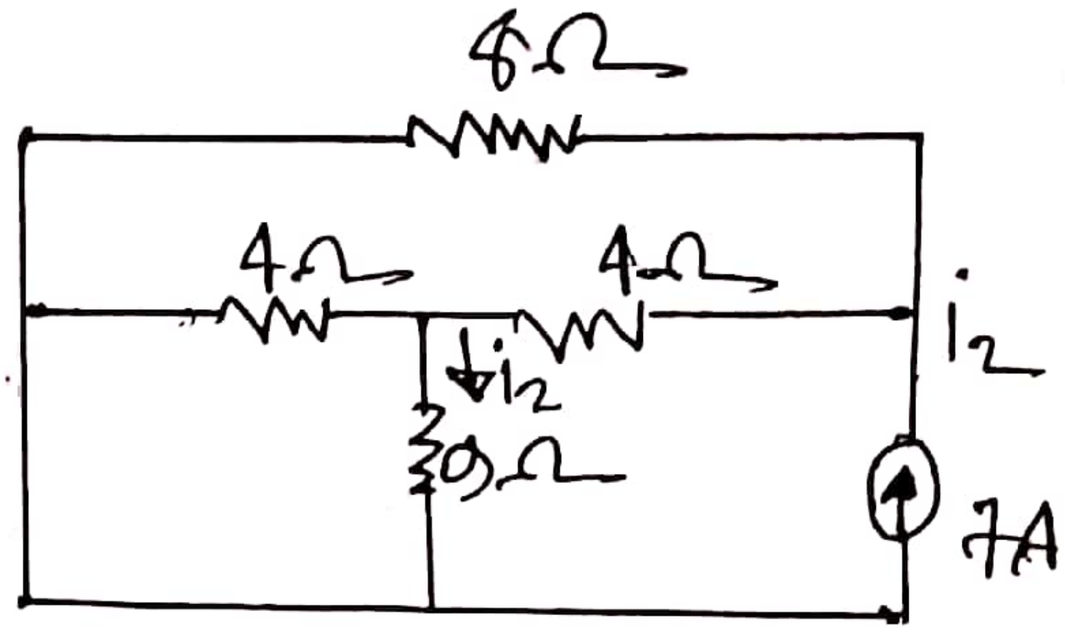
$= i_1 + i_2 + i_3$

where i_1, i_2 and i_3 are due to the 14V, 2V and 7A Sources respectively. The circuit become.



(a)





$$R_T = \{(8+4) \| 4\} + 9$$

$$= 12\Omega$$

$$\therefore I_T = \frac{14}{12} = 1.17\ A$$

when 2V Active

$$R_T = (4 \| 9) + 4 + 6$$

$$= 14.77\Omega$$

$$I_T = \frac{2}{14.77}$$

$$= 0.135\ A$$

$$i = \frac{0.135 \times 4}{9+4}$$

$$= 0.042\ A$$

when 7A Active:

$$I_1 \text{ 4}\Omega = \frac{7 \times 8}{8 + (4 \| 9) + 4} = 3.792 \text{ Amp}$$

$$\therefore \quad I_2 = \frac{3.792 \times 4}{4 + 9} = 1.17 \text{ A}$$

$$\therefore \quad I_3 = I_1 + I_2 + I_3$$

$$= -0.042 + 1.17 + 1.17$$

$$= 2.205 \text{ A}$$

Ans

Ans to the question no: 5

Let,

Z_1 = Impedence of the 5Ω resistor in Series with the 5mF capacitor

Z_2 = Impedance of the 0.7H Inducter in Series with the 6-Ω ~~resistor~~ resistor.

Then

$$Z_1 = \frac{1}{j\omega C} = \frac{1}{j50 \times 5 \times 10^{-3}} = (5 - j4)\Omega$$

$$Z_2 = 6 + j\omega L = 6 + j50 \times 0.7 = (6 + j35)\Omega$$

The Input Impedence is

$$Z_{in} = Z_1 \| Z_2 = \frac{(5 - j4)(8 + j35)}{13 + j31}$$

=

Ans to the question no : 6

(a) Given that pf = $\cos\theta = 0.856$, we obtain the power angle as $\theta = \cos^{-1} 0.856 = 31.13°$. If the apparent power is $S = 12000$ VA, then the average or real power is

$$P = S\cos\theta = 12000 \times 0.856 = 10.272 \text{ kW}$$

~~(b) while the pf is lagging, the compte~~

(b) while the reactive power is

$$Q = S\sin\theta = 12000 \times 0.517 = 6.204 \text{ kVA}$$

(c) Since the is lagging, the complex power is

$$S = P + jQ = 10.272 + j6.204 \text{ kVA}$$

From $S = V_{rms} I_{rms}$, we obtain

$$I_{rms} = \frac{S}{V_{rms}} = \frac{10272 + j6204}{120\angle 0°} = 85.6 + j51.7 \text{ A}$$

$$= 100\angle 31.13° \text{ A}$$

P.T.O

(d) Thus $I_{nms} = 100 \angle -31.13^\circ$ and the peak current is

$$I_m = \sqrt{2} I_{nms} = \sqrt{2}(100) = 141.4A$$

(e) The load impedance

$$Z = \frac{V_{nms}}{I_{nms}} = \frac{120 \angle 0^\circ}{100 \angle -31.13^\circ} = 1.2 \angle 31.13^\circ.$$