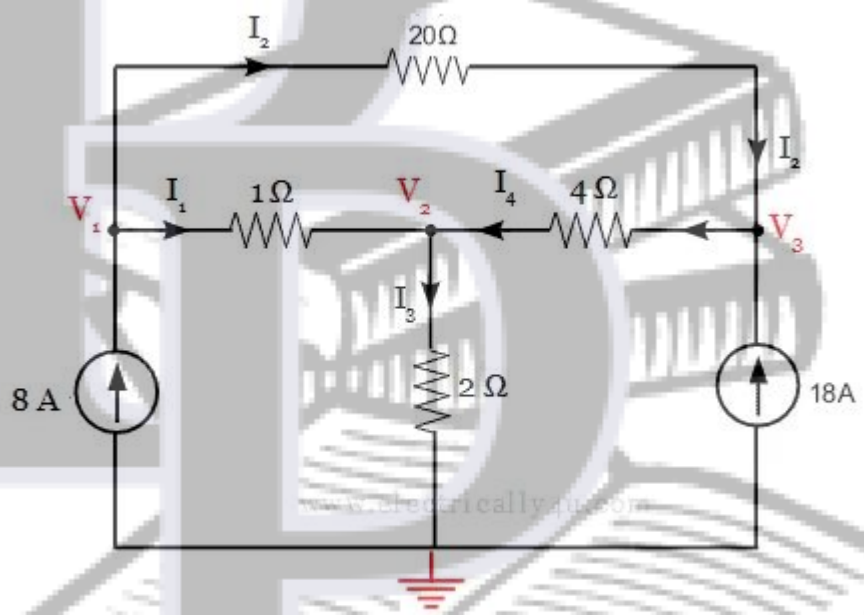
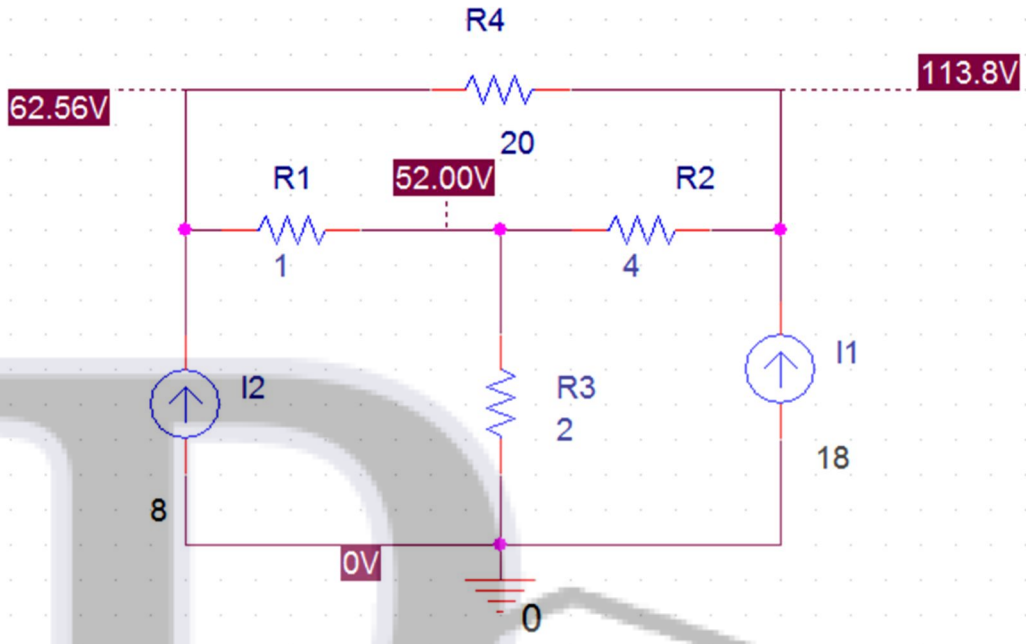
| Name of Examination | Continuous Assessment Test -1 (CAT-1), Fall 2021-2022 Semester, (**October 2021)** | |
|---|---|---|
| Slot: **A1** | Course Mode: **CBL** | Class Number (s): **VL2021220105914** |

| Course Code: | **EEE101L** | Course Title: | **Basic Electrical Engineering** |
|---|---|---|---|
| Faculty Name: | **Dr. R.Saravana Kumar** | School: **SELECT** | |

*General Instructions (if any):*

| Q. No. | SET | Question |
|---|---|---|
| 1 | A | Determine all the **nodal voltages** for the circuit shown in Fig.1 by applying nodal voltage method.   **Fig.1** |




1. B Find all the **branch currents** for the circuit shown in Fig . 1 by applying mesh current method

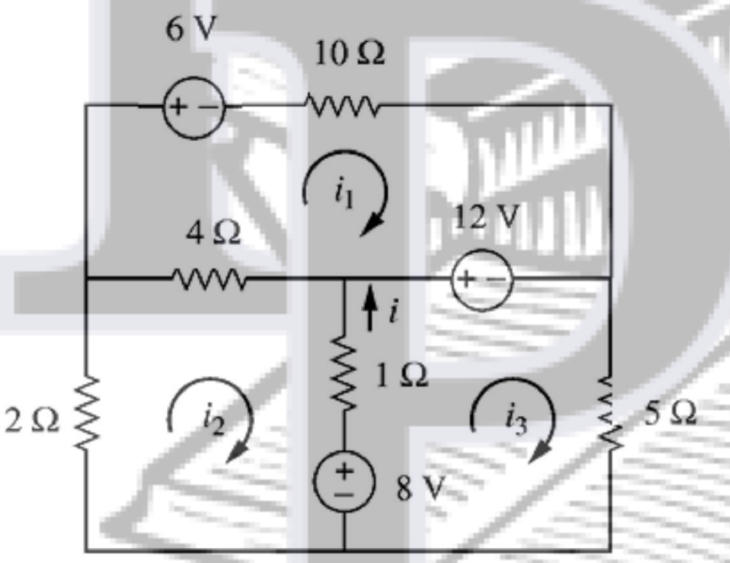
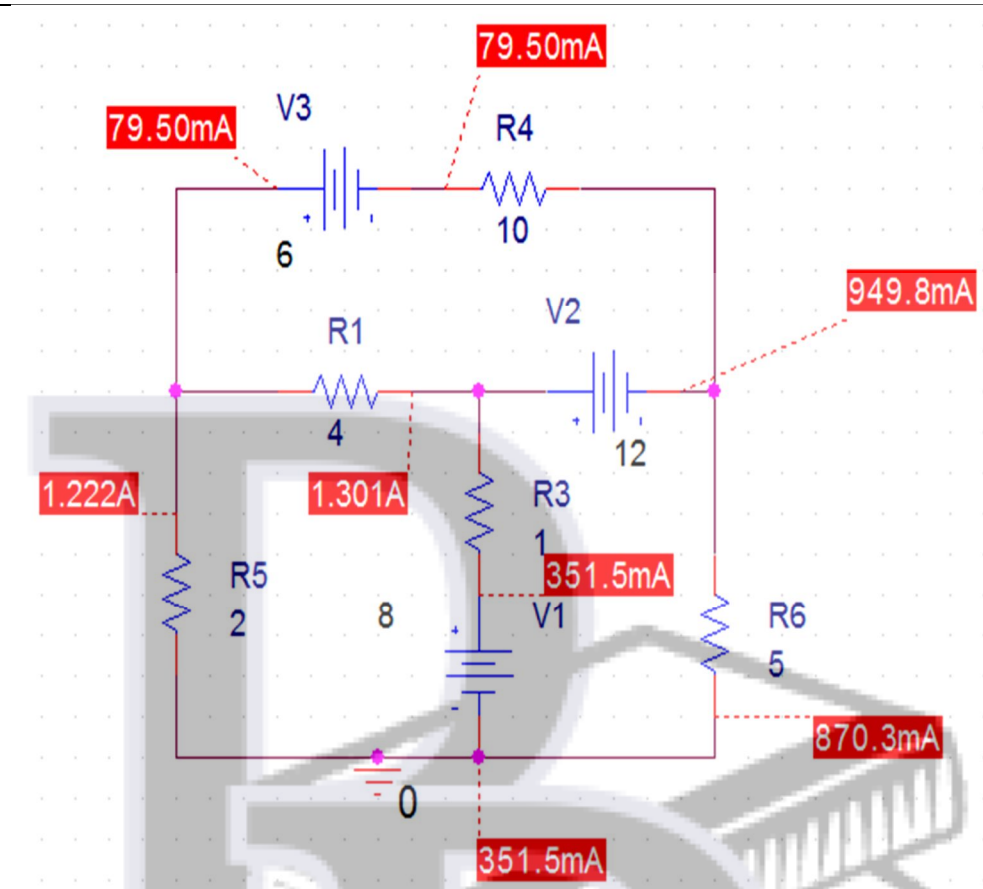



**Fig . 1**




C Find **all the branch currents** for the circuit shown in Fig . 1 by applying mesh current method

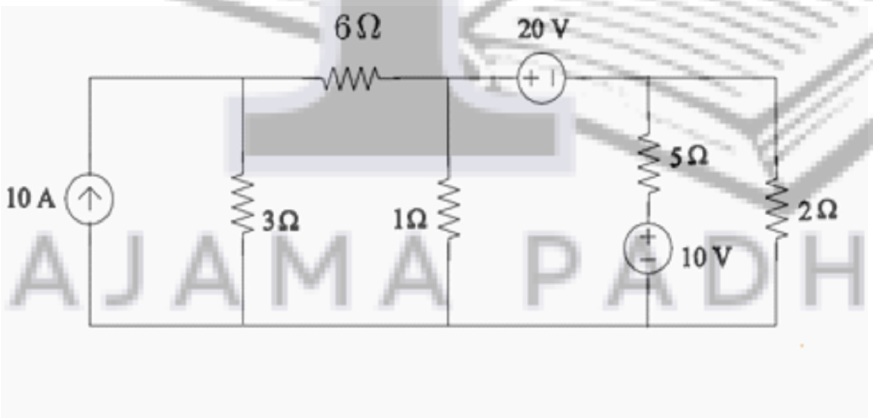
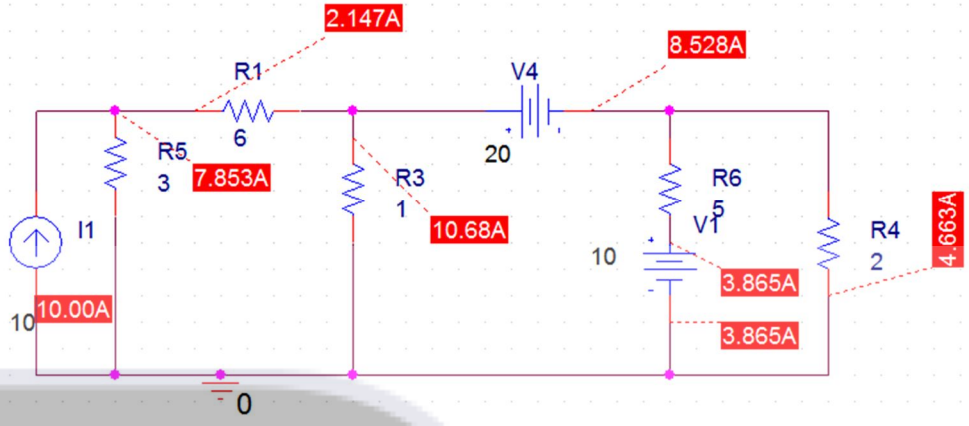
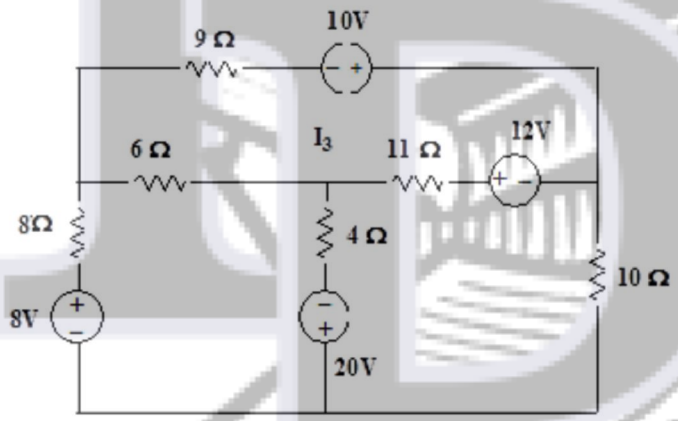



**Fig . 1**




D Determine all the **nodal voltages** for the circuit shown in Fig.1 by applying nodal voltage method.



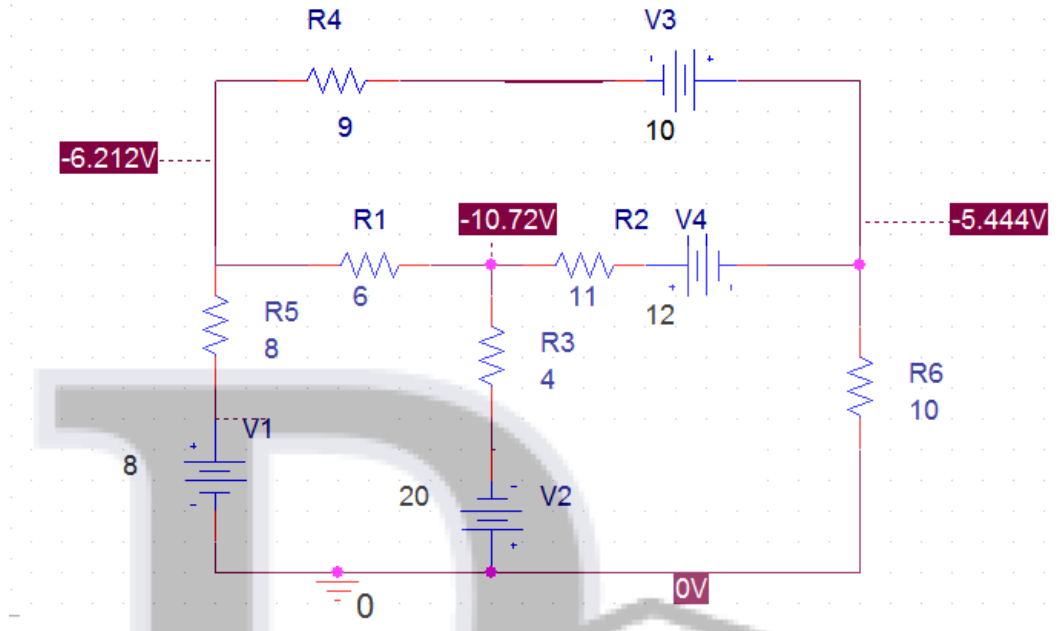



Fig.1

2. A **Find-out the value of current in 5 Ω resistance for the given circuit shown in fig. by applying Thevenin's theorem?**

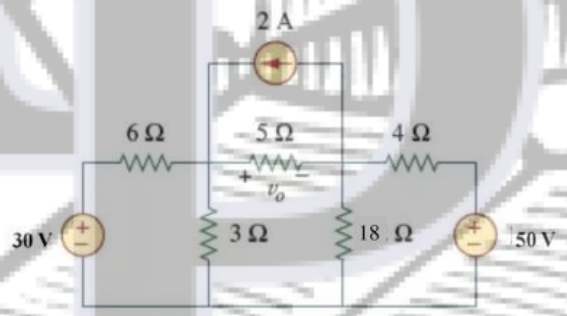
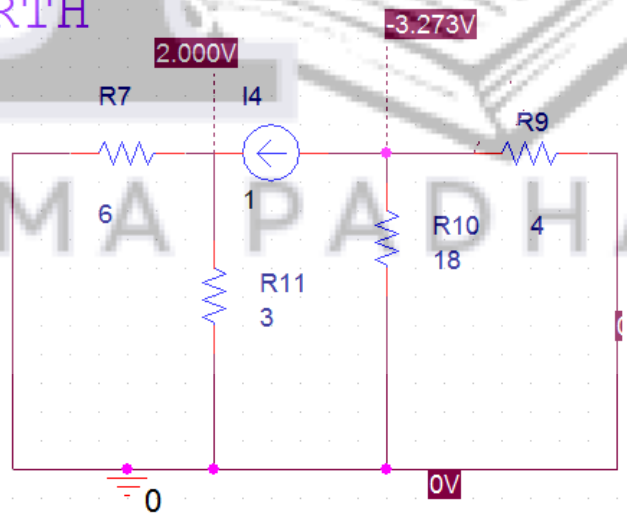
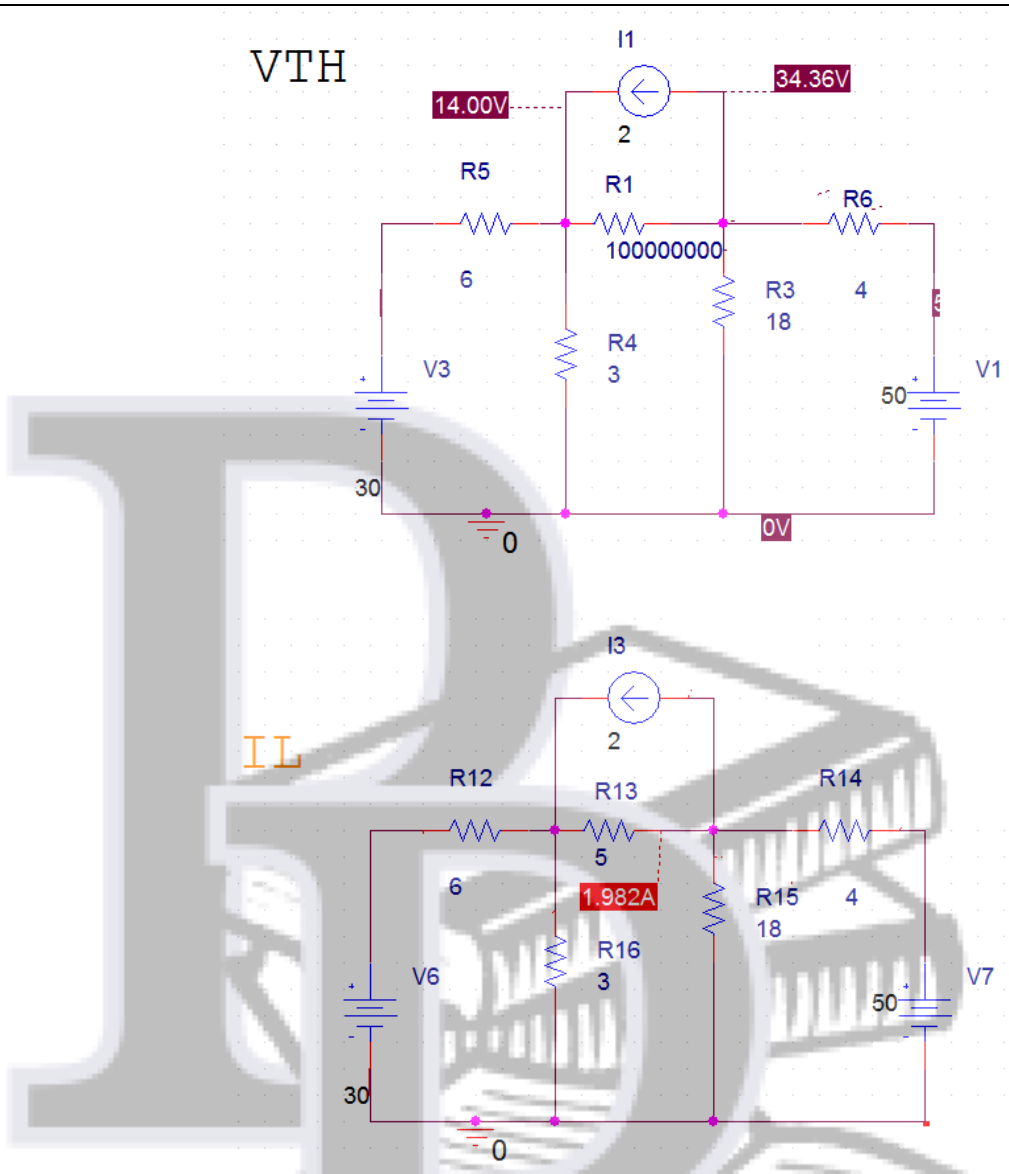



Fig. 2






B

For the circuit shown in **Fig.-2, Determine** the value of $R_L$ for the maximum power deliverable to the load ($R_L$) and also determine its maximum power.

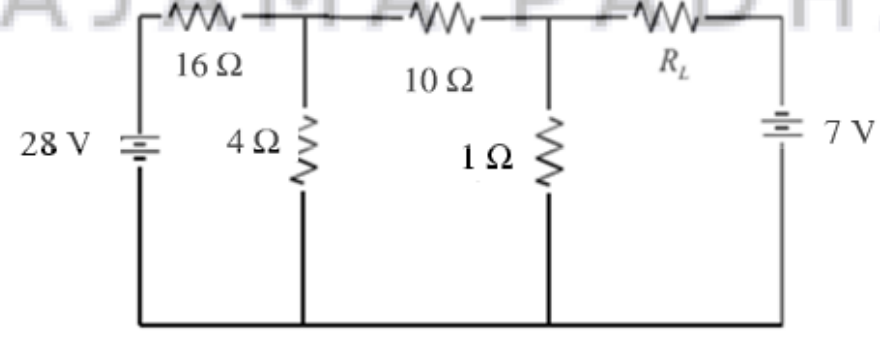
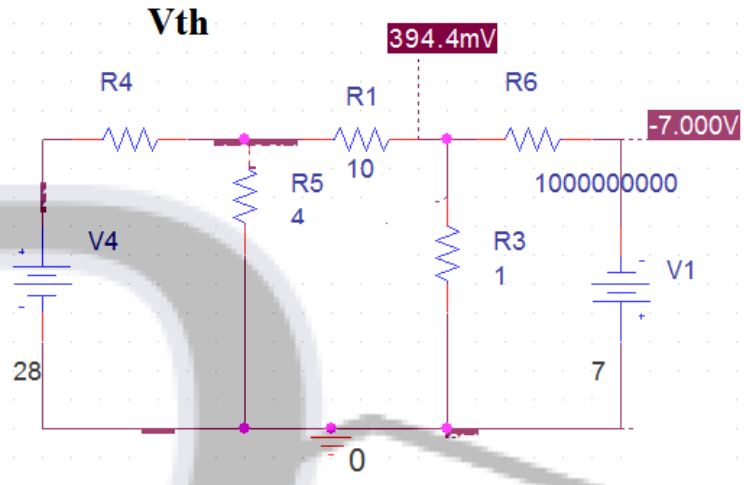
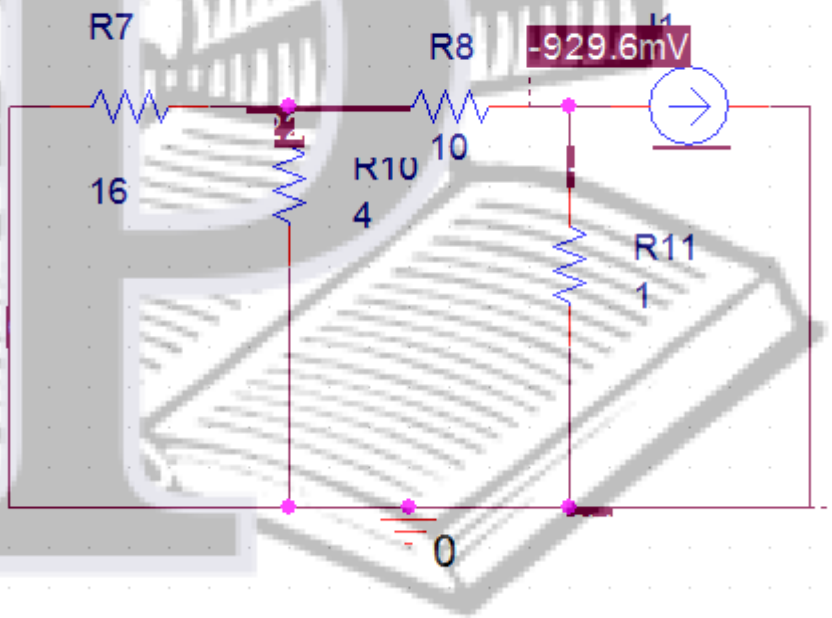
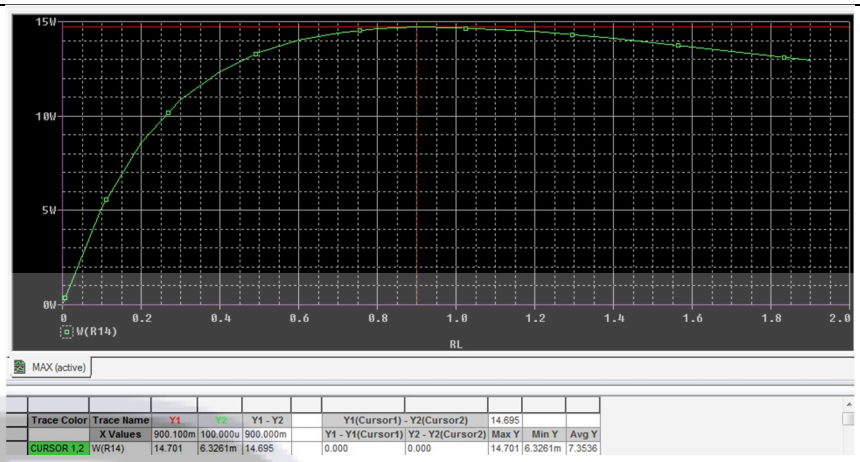


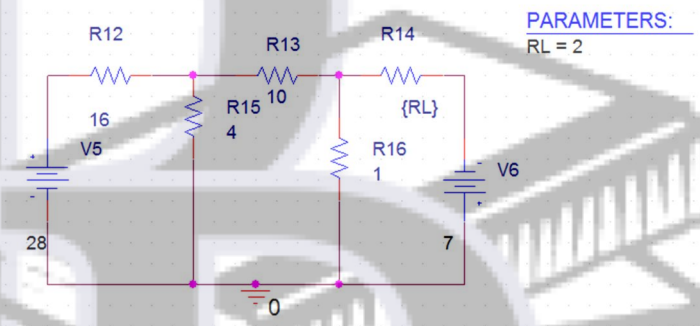
**Fig.-2**






| Trace Color | Trace Name | Y1 | Y2 | Y1 - Y2 | Y1(Cursor1) - Y2(Cursor2) | | 14.695 | | |
|---|---|---|---|---|---|---|---|---|---|
| | X Values | 900.100m | 100.000u | 900.000m | Y1 - Y1(Cursor1) | Y2 - Y2(Cursor2) | Max Y | Min Y | Avg Y |
| CURSOR 1,2 | W(R14) | 14.701 | 6.3261m | 14.695 | 0.000 | 0.000 | 14.701 | 6.3261m | 7.3536 |




| Trace Color | Trace Name | Y1 |
|---|---|---|
| | X Values | 900.100m |
| CURSOR 1,2 | W(R14) | 14.701 |

C **Find-out the value of current in 10 Ω resistance for the given circuit shown in Fig. 2 by applying Thevenin's theorem?**

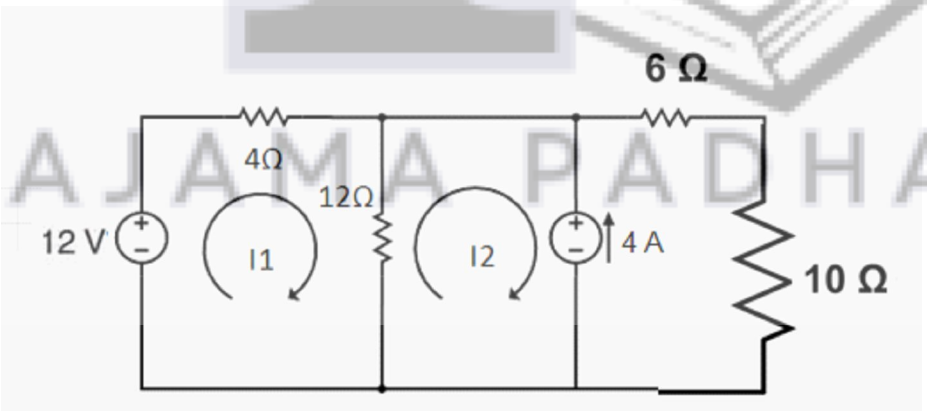



**Fig. 2**

| | | |
|---|---|---|
| | D | By applying Maximum power transfer theorem, find the value of resistance *R and* maximum power that can be delivered to the resistor *R* in the circuit in **Fig.2** |

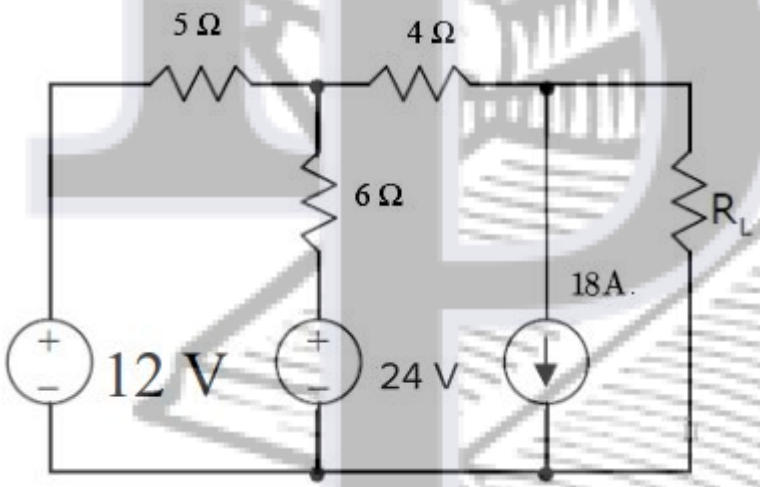


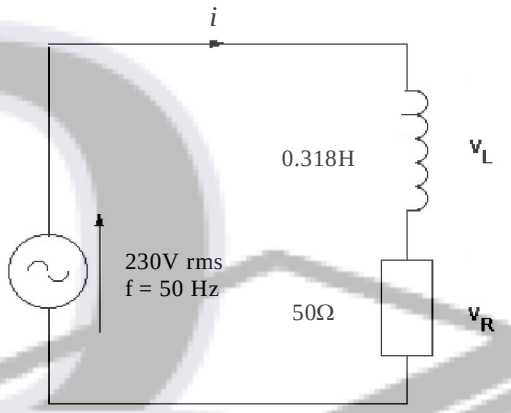

**Fig.2**

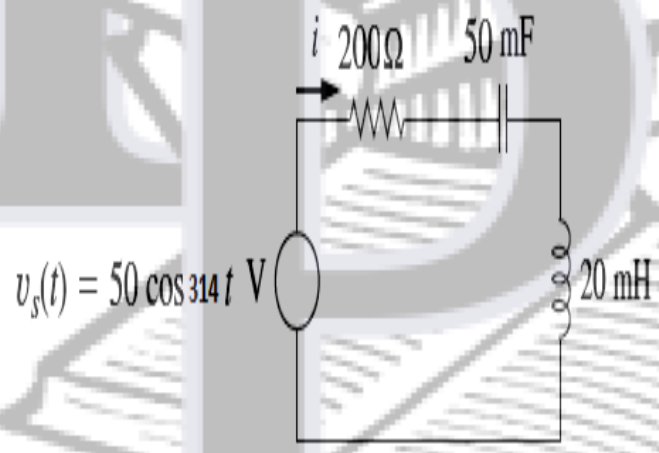


$V_{th}$ = -103. 6 Volts

$R_{th}$ = 6.727 ohm

$P_{max}$ = 398.876 watts

| | | |
|---|---|---|
| 3 | A | For the given circuit shown in Fig.3 , Determine<br>**a)** The supply current = **2.05 A**<br>b) The voltage across each element<br>**Vr = 102.5 V ; VL= 204.7 V**<br>c) Power factor of the circuit =**0.447**<br>d) Power consumed by each element<br>**Pr = 210.125 W ; PL= 421.5VAR**<br>e) Draw the impedance phasor diagram<br>  <br>Fig.3 |
| | B | A circuit, having a resistance of 10 Ω with an inductance of 0.5 H and a variable capacitance in series, is connected across a 230 V, 50 Hz supply. Determine ,<br>(a) the capacitance required to **attain resonance; C= 20 microparad**<br>(b) supply current **I = 23 A**<br>(c) voltages across the inductance and the capacitance **at resonance;**<br>**VL = VC= 3611 V**<br>(d) the *frequency* at resonance = **50.3 Hz.**<br>(e) Draw the impedance phasor diagram. |
| | C | A capacitor C is connected in series with a 10 Ω resistor across a supply frequency of 50 Hz. A current of 2.5 A flows and the circuit impedance is 50 Ω.<br>Calculate:<br>(a) the value of capacitance **'C' = 65 micro farad.**<br>(b) the phase angle = **78.46** and power factor = **0.2** |

| | | |
|---|---|---|
| | | (c) the potential drop across the resistor and the potential drop across the capacitor.<br><br>**Vr = 25 V ; VC= 122.45 V**<br>(d) the active power, reactive and apparent power.<br><br>**P = 62.5W ; Q= 306.1 VAR ; S= 312.5 VA**<br><br>(e) Also draw the power phasor diagram |
| | D | For the given series RLC circuit shown in **Fig . 3** Determine<br><br>**(i)** Total impedance of the circuit **= 200.096 OHM**<br>(ii) supply current **=0.176 A**<br>(iii) phase angle **-= 1.782** and power factor **=0.99**<br>(iv) Voltage across each element.<br>**Vr =35.2 V ; VL = 1.105 V ; VC= 0.112 V**<br><br>(v) Draw the impedance phasor diagram.<br><br>  <br><br>**Fig . 3** |