

1. Please write brief and "to the point" answers.
2. No clarifications please.
3. Put down any assumptions you make in your answer script

Date: 28/8/2016
Duration: 60 minutes
Max. Marks: 30

1. The circuit in Fig 1 is at steady state condition (i.e. turned on for a long time).

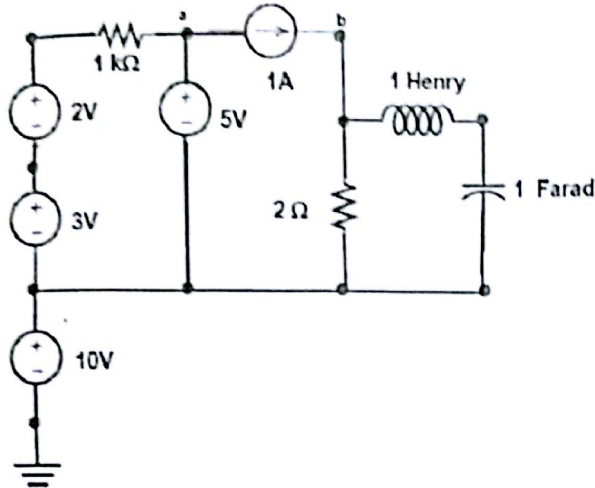


Fig. 1

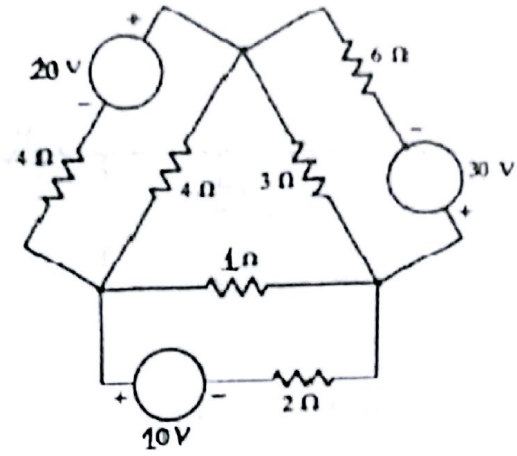


Fig. 2

Write whether power is supplied OR power is dissipated OR no power transfer in the following circuit elements and give a brief reason for your answer. (i) 10 V voltage source (ii) 1 kΩ resistor (iii) 1 H inductor (iv) 1 F capacitor
(No need to calculate the exact value of power)

(6 MARKS)

2. Solve for the current in 1 Ω resistance in the circuit in Fig. 2. **(6 MARKS)**
3. An R-L series circuit with $R=3\ \Omega$ and $L=12.74\ \text{mH}$ is supplied by a 50 V (rms), 50 Hz single phase supply. If a capacitor of $398.1\ \mu\text{F}$ is connected across the inductor what will be the change in the power factor (at the source terminal) as compared to the original R-L circuit? Comment on why the power factor seems to have deteriorated despite the addition of a capacitor. Calculate the currents in L and C. Draw the phasor diagram for the circuit having R in series with $(L \parallel C)$. **(8 MARKS)**
4. In Fig. 4, S had been closed for a long time and it is opened at time $t=0$. Determine the inductor current $i(t)$ for $t \geq 0$. What is the maximum value of current and what is the 't' value at which this maximum current occurs? Sketch the waveform of the current $i(t)$ for $t \geq 0$. **(10 MARKS)**

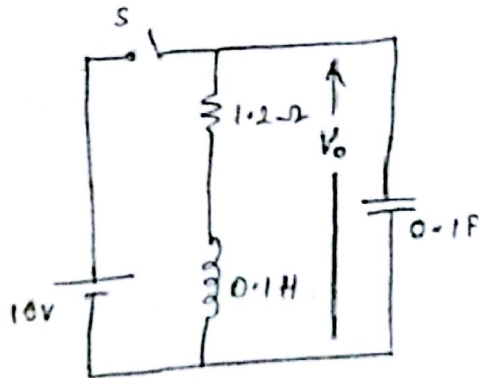


Fig.4