

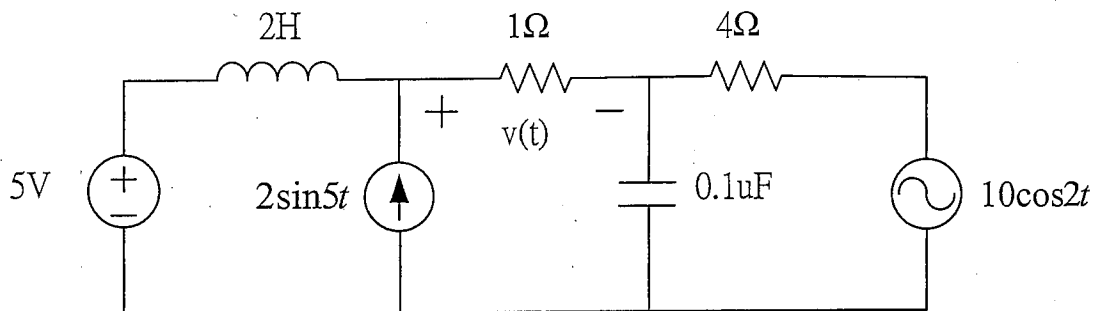
國立中山大學 101 學年度碩士暨碩士專班招生考試試題

科目：電路學【電機系碩士班丁組】

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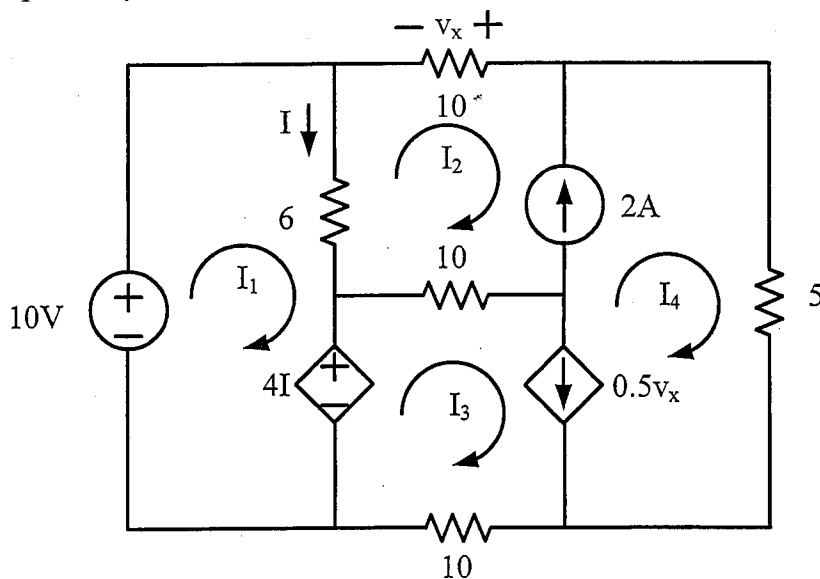
1. (10pt) A balanced delta-connected load is connected to the generator by a balanced transmission line with impedance of $0.1+j0.2\Omega$ per phase. The load is rated at 500kW, 0.866 power factor lagging, 440V_{rms} line voltage. Find line current and line voltage of the generator, respectively.

2. (10pt) Find $v(t)$ in the sinusoidal steady state.

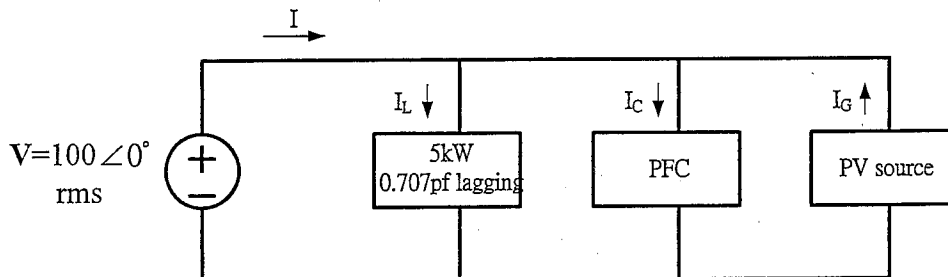


3. (20pt) Phase voltage and phase current of a load are given as $v(t)=100\cos\omega tV$, $i(t)=10\sin(\omega t+60^\circ)+2\sin(3\omega t+60^\circ)A$. Find power factor, instantaneous power, average power, and apparent power of the load.

4. (20pt) Use mesh analysis to find I_1, I_2, I_3, I_4 . Voltage, current, and resistance units are V, A, and Ω , respectively.



5. (20pt) A power-factor-correction (PFC) capacitor is designed to improve power factor of the load (5kW) equal to 0.9. Assume the PV is a current source inverter to deliver 2kW average power to the system.
- (A) Calculate I , I_L , I_C , and I_G .
- (B) Construct phasor diagram of V , I , I_L , I_C , and I_G .
- (C) Construct power triangle diagram.



6. (20pt) A buck converter is given with the following parameters: $V_g=40V$, $V_o=30V$, the switching frequency of S is 40kHz, output power is 100W. Draw waveforms of v_D , v_L , i_C , i_L , i_g for $L=40\mu H$ and $L=10\mu H$, respectively.

