國立中正大學 107 學年度碩士班招生考試試題

系所別：電機工程學系- 信號與媒體通訊組
電力與電能處理甲組

科目：電路學

第 1 節

1. Given the network in Fig. 1, find: (a) C; (3%) (b) the power dissipated in the 2Ω resistor; (6%) (c) the energy stored in the 2H inductor. (6%)

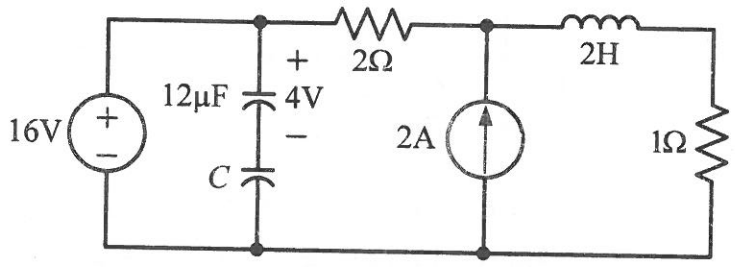

Fig. 1

2. The output of the circuit in Fig. 2 is $V_o = k_1 V_1 - k_2 V_2$, (a) find k_1, k_2 in terms of R_1, R_2, R_3, R_4; (10%) (b) if $k_1 = 4, k_2 = 5, R_1 = 1\text{k}\Omega, R_3 = 1\text{k}\Omega$, find R_2, R_4.(6%)

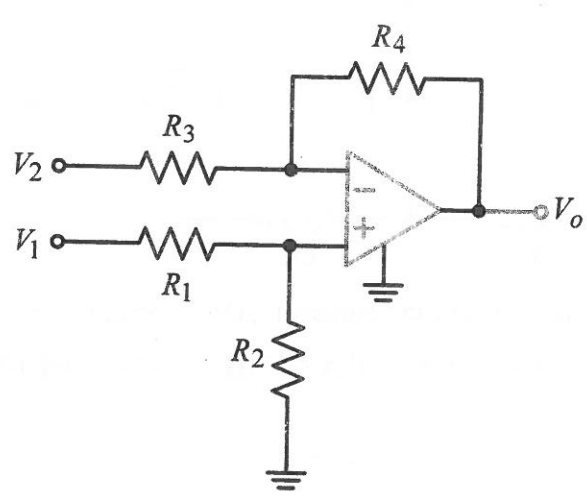

Fig. 2

3. Find C in the circuit in Fig. 3 such that the total load has a power factor of **0.95 lagging**. (16%)

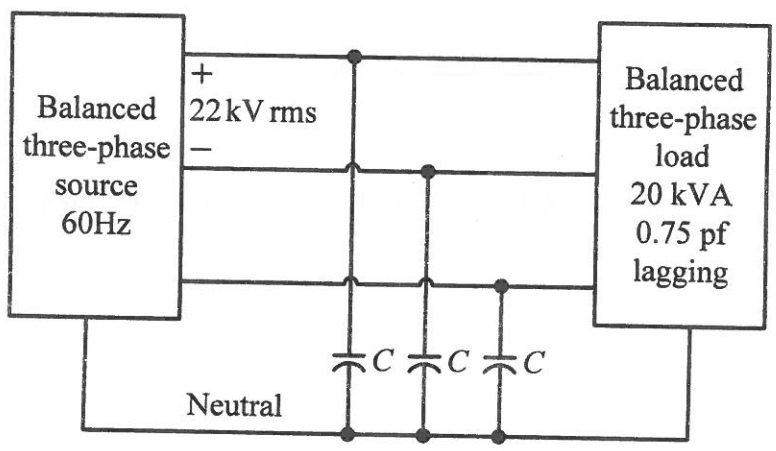

Fig. 3

4. Use **Thévenin's theorem** to find $v_o(t)$ in the circuit in Fig. 4 if $f = 100\text{Hz}$. (18%)

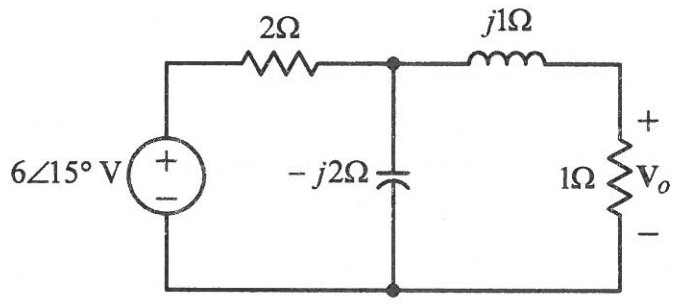

Fig. 4

5. Find and use the transfer function $\mathbf{H}(s) = \mathbf{V}_o(s)/\mathbf{V}_i(s)$ of the circuit shown in Fig. 5 to determine the steady-state response $v_{oss}(t)$ (assume zero initial conditions). (17%)

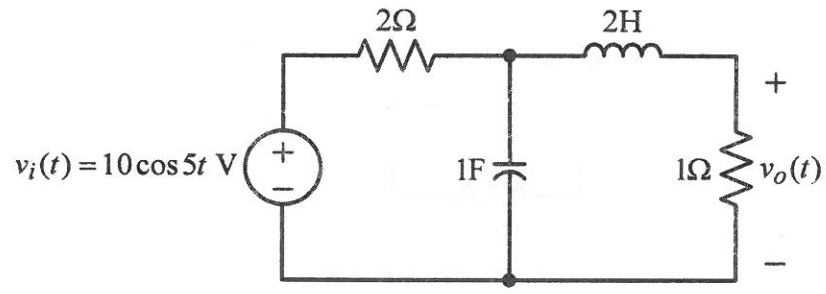

Fig. 5

6. Two-port A and Two-port B are connected in series as shown in Fig. 6.
   (a) Find the **Z** parameters of the Two-port A. (5%)
   (b) Find the total **Z** parameters of the series two-port network. (3%)
   (c) Determine the output voltage $\mathbf{V}_o$ of the network. (10%)

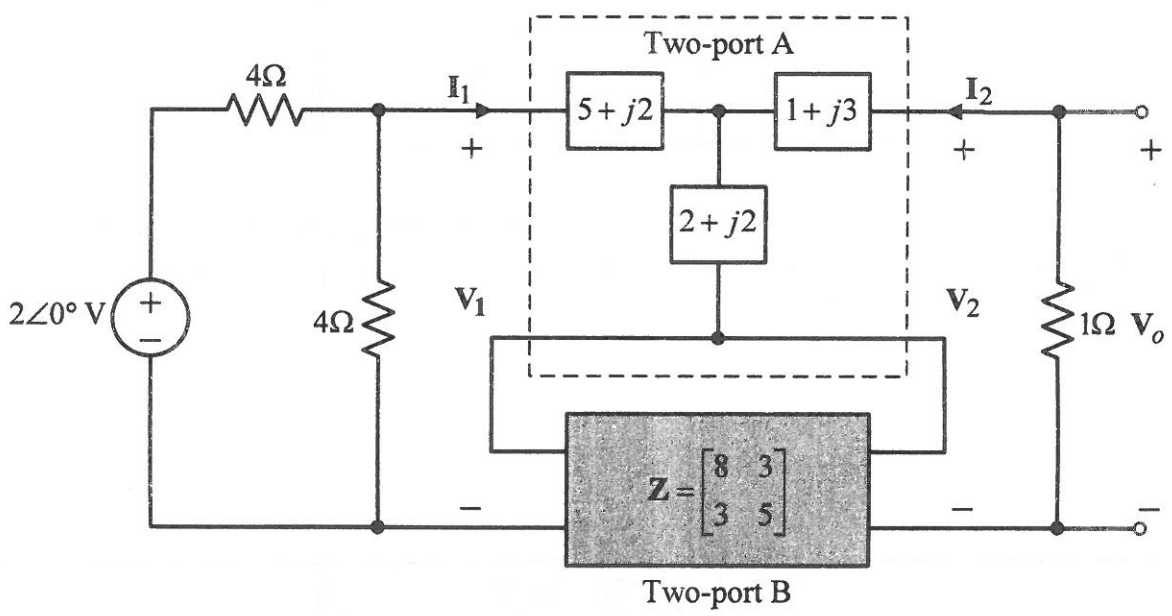

Fig. 6