

國立成功大學
110學年度碩士班招生考試試題

編 號：170

系 所：電機工程學系

科 目：電路學

日 期：0202

節 次：第 1 節

備 註：可使用計算機

※ 考生請注意：本試題可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. The circuit shown in Fig. 1 uses an ideal op amp.
 - (a) Obtain the transfer function of V_o/V_i . (5%)
 - (b) Calculate the minimum value of R_o that will cause oscillation to occur if $V_i = 0$ V. (10%)
 - (c) According to (b), find the frequency of oscillation. (5%)

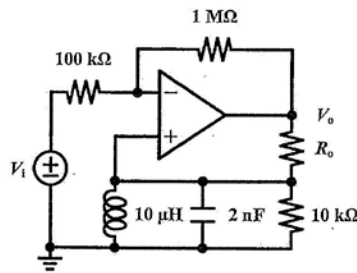


Fig. 1

2. Refer to the network shown in Fig. 2, let $V_s = 100\cos(2000t)$ V.
 - (a) Find the complex power delivered by V_s , assume that the unknown element is NOT connected. (10%)
 - (b) Determine the parallel element that will give a unity power factor when it is connected. (10%)

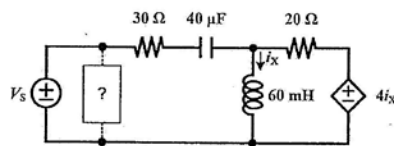


Fig. 2

3. For the two-port network shown in Fig. 3, obtain the $ABCD$ parameters. (10%)

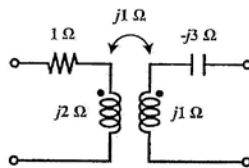


Fig. 3

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4. Determine the value of the voltage v_x in the circuit of Fig. 4. (15%)

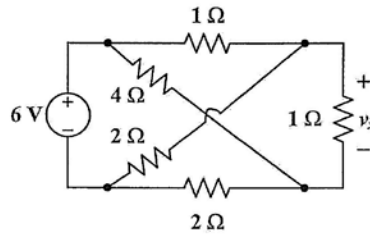


Fig. 4

5. Find the value of the resistance R in the circuit of Fig. 5 if the current I is equal to 0.5 mA. (15%)

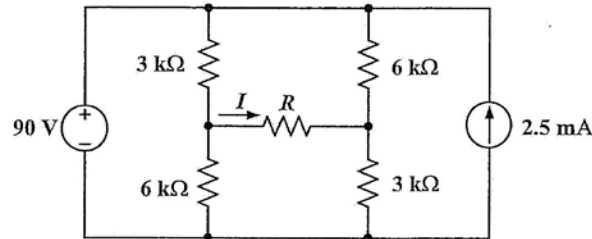


Fig. 5

6. For the circuit shown in Fig. 6, assume that all the energy-storage elements have no initial condition at $t = 0$ s. Obtain $v_o(t)$ for $t > 0$ s if $i_s(t) = e^{-t}u(t)$ A and $v_s(t) = 3u(t)$ V, where $u(t)$ is a unit step function. (20%)

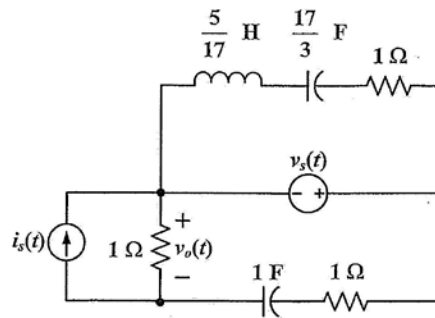


Fig. 6