國立臺灣大學100學年度碩士班招生考試試題

1. For the circuit shown in Fig. 1 with input voltage V_1=2V and V_2=6V. (a) Please determine the output voltage V_{out} = ? (b) If R_f is replaced by a 600 kΩ resistor, what is the new output voltage V_{out} = ? [20]

2. For the circuit shown in Fig. 2, please use mesh analysis method to determine the current I_2. [20]

3. The switch S shown in Fig. 3 had been closed for a long time. It opens at t = 0. Please find the capacitor voltage $v_C(t)$ for t > 0. [20]

4. The induction motor, IM, in Fig. 4 draws 10 KVA, 40 Arms, at power factor PF=0.8 lagging. Please determine the value of the capacitor C to allow the 220Vrms, 60Hz source to operate at power factor PF=0.95 lagging. [20]

5. For the circuit shown in Fig. 5, the given input voltage is: $v_s(t)$ = 20 V for t < 0; $v_s(t)$ = -20 V for t > 0. Please (a) draw the s-domain equivalent circuit with input and initial-value sources [5]; (b) determine the s-domain expression of capacitor voltage V_C(s)[5]; (c) determine the time-domain expression of $v_c(t)$ for t > 0. [10]

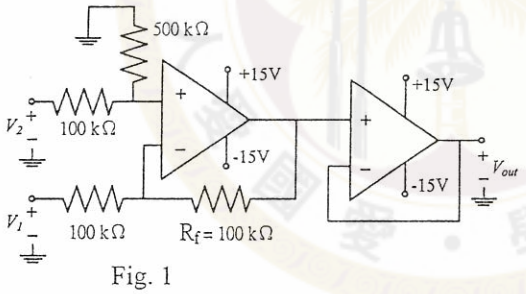

Fig. 1

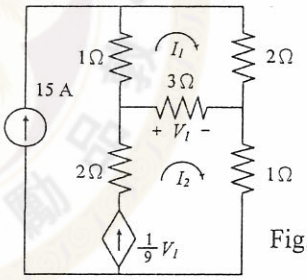

Fig. 2

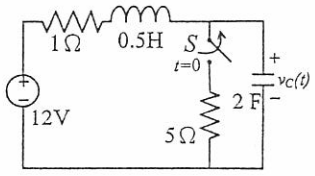

Fig. 3

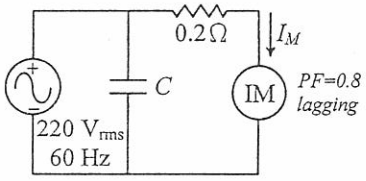

Fig. 4

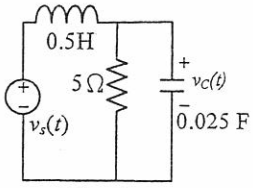

Fig. 5

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