**King Saud University**
**College of Engineering**
**Dept. of Electrical Engineering**

**EE-212: *Electric Circuits***
**First Midterm Exam.**
**Sat. 27.11.1433 (*13.10.2012*)**
**Time Allowed: 1 H.+ 45 Minutes**

**الرقم** **الاسم:**

## Question1

A) (14 points).

In the circuit shown in Figure 1, determine the value of current $I_x$.

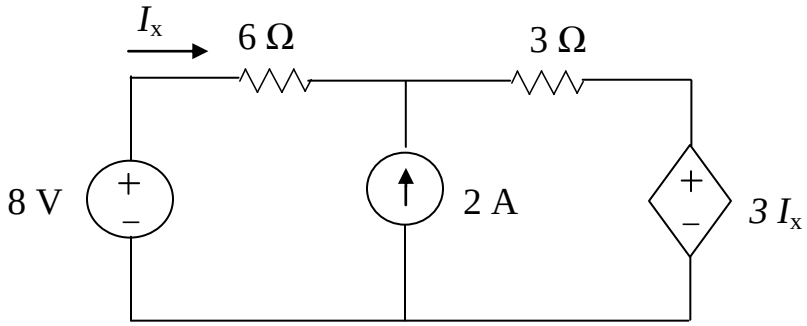


Fig. 1

B) (14 points)

In the circuit shown in Figure 2, determine the power supplied by the 12-V voltage source.

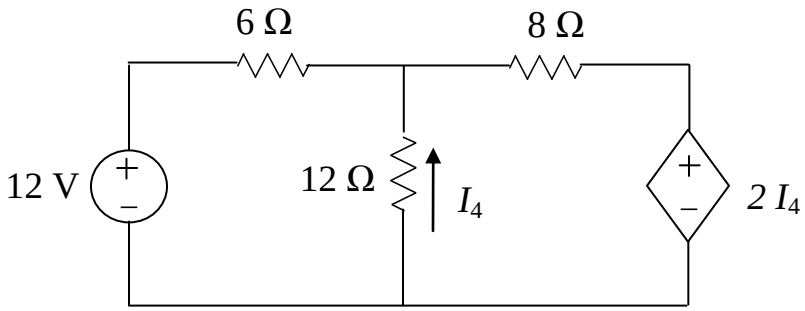


Fig. 2

C) (14 points).

In the circuit shown in Figure 3, the 20-V voltage source supplies 2 W of power. The value of the voltage $v_2$ across the 25-Ω resistor is $v_2$ = 4 V. Determine the value of the resistance $R_1$ and of the value of $G$.

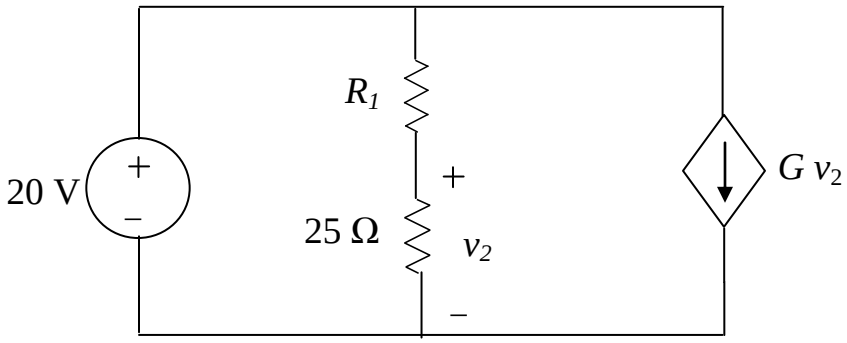


Fig. 3

**Question2**

A)(14 points).

In the circuit shown in Figure 4, determine the value of $V_0$ and $I_0$. Assume ideal amplifier.

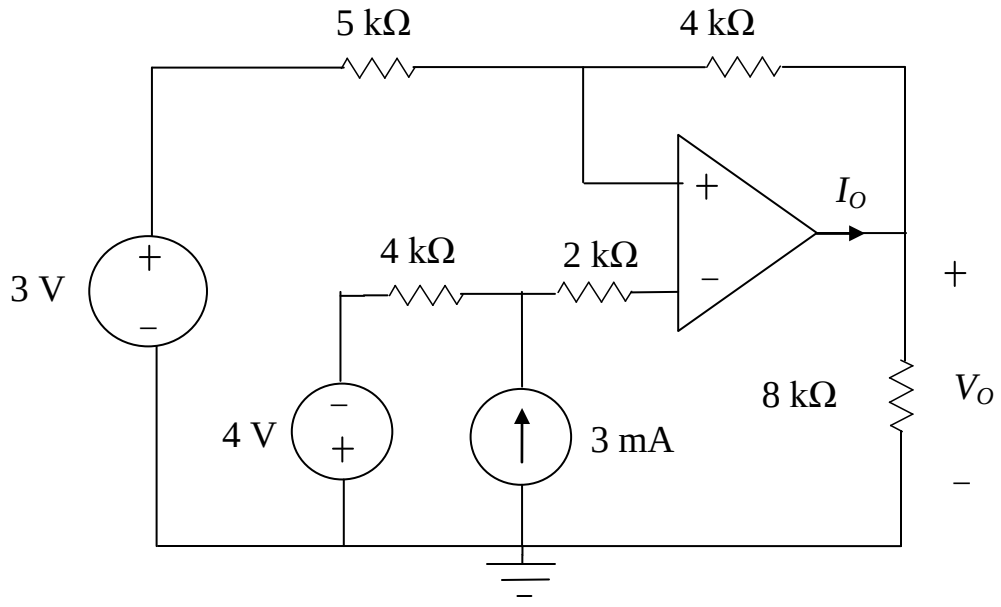


Fig. 4

B) (14 points).

In the circuit shown in Figure 5, determine the value of voltages at nodes *a*, *b*, *c*, and *d*. Assume ideal amplifier.

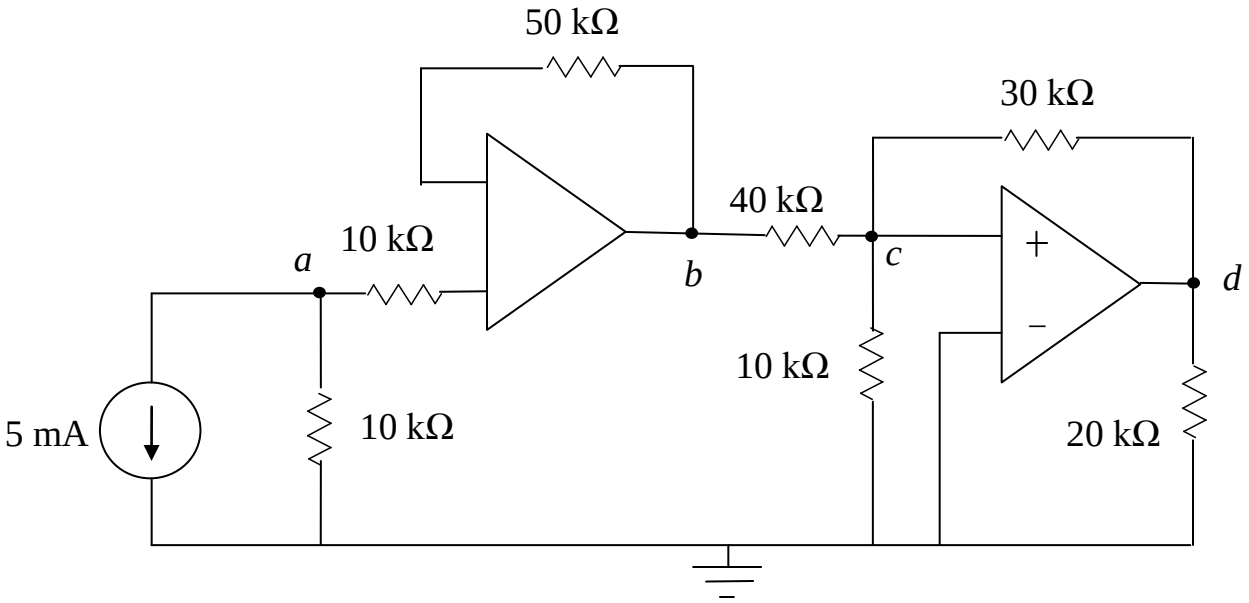


Fig. 5

C) (15 points).

In the circuit shown in Figure 6, determine the value of $V_0$. Assume ideal amplifier.

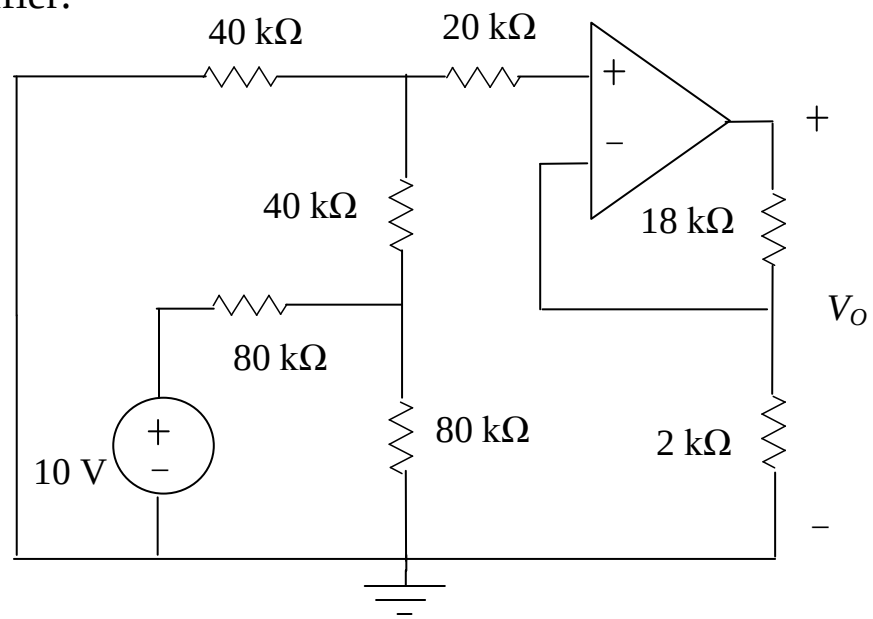


Fig. 6

**Question3** (16 points)

In the circuit shown in Figure 7, the switch *S* has been closed for a long time.

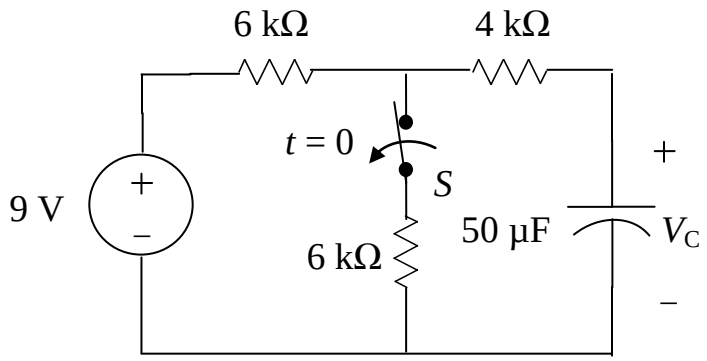


Fig. 7

i) With switch *S* closed, determine the voltage across the capacitor $V_C$.
ii) If the switch *S* is opened at *t = 0*, and left open for a long time, determine the final value of the capacitor voltage $V_C(\infty)$.
iii) Write the mathematical expression for $V_C$ as a function of time $V_C(t)$ for $t > 0$.
iv) Sketch variation of $V_C(t)$ with time .