KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS

ELECTRICAL ENGINEERING DEPARTMENT

FIRST SEMESTER 2007/2008

EE 201 MAJOR EXAM   II

DATE: TUESDAY 11-12-2007

TIME: 6:30-8:00 PM

Locations:

Dr. Samir Abdul-Jauwad (Section 04): Building **24**, Room **128**.
Dr. Abdallah Al-Ahmari (Sections 02 & 05): Building **24**, Room **120**.
Dr. Adel Balghonaim (Section 07): Building **24**, Room **129**.
Dr. Husain Masoudi (Sections 06 & 08): Building **14**, Room **108**.
Dr. Husain Al-Jamid (Section 01): Building **14**, Room **108**.

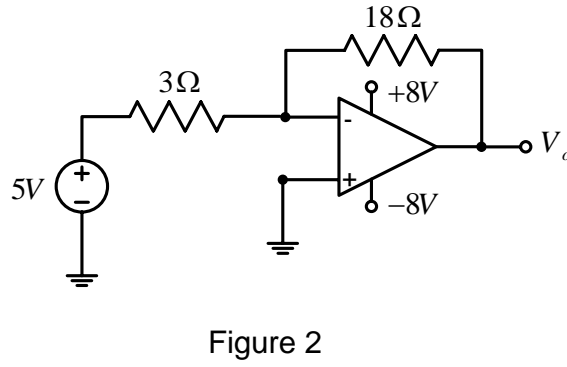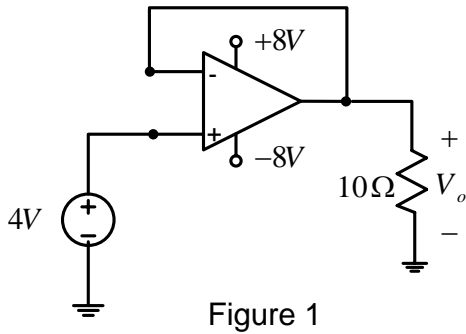Student's Name:…………………………………….

Student's I.D. Number:………………….

Section Number: …………………….

	Maximum Score	**Score**
Problem 1 (a)	**10**	
Problem 1 (b)	**10**	
Problem 2 (a)	**13**	
Problem 2 (b)	**7**	
Problem 3	**20**	
Total	**60**	

Problem 1 (a) [10 pts]

i) Find the output voltage V_o in the Op Amp circuit shown in figure 1.

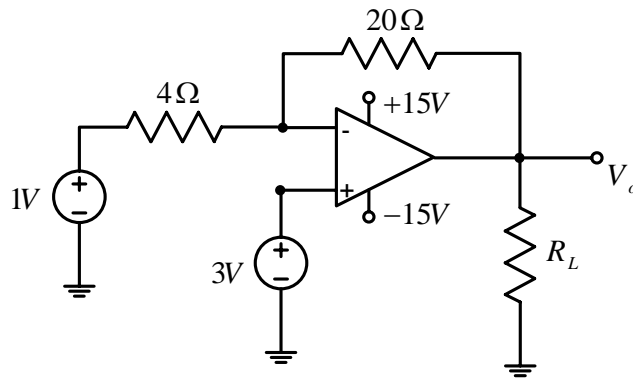**ii)** Find the output voltage V_o in the Op Amp circuit shown in figure 2.

Figure 1

Figure 2

Answers:

i) $V_o =$

ii) $V_o =$

Problem 1 (b) [10 pts]

In the Op Amp circuit shown, the load resistor R_L and the 4Ω resistor absorb *equal* powers. Calculate the value of the load resistor R_L.
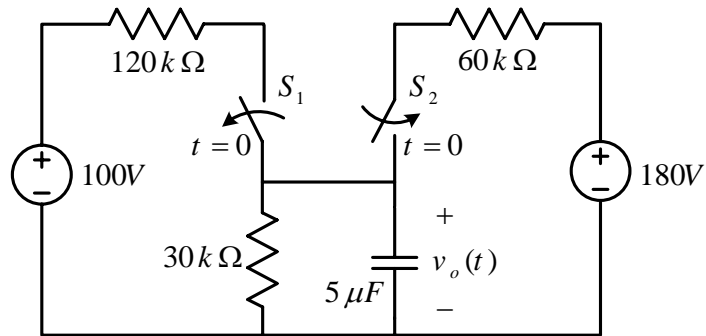

Answer:

$R_L =$

Problem 2 (a) [13 pts]

In the circuit shown, switch S_1 has been closed and switch S_2 has been open for a long time. At $t = 0$, switch S_1 is opened and switch S_2 is closed suddenly.

i) Find the voltage $v_o(t)$ for $t < 0$.   **ii)** Find the voltage $v_o(t)$ for $t \geq 0$.   **iii)** Plot $v_o(t)$ for all t.

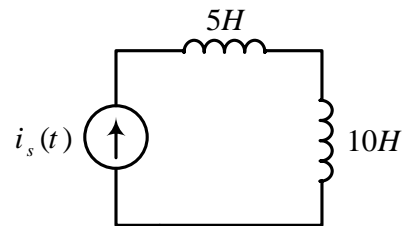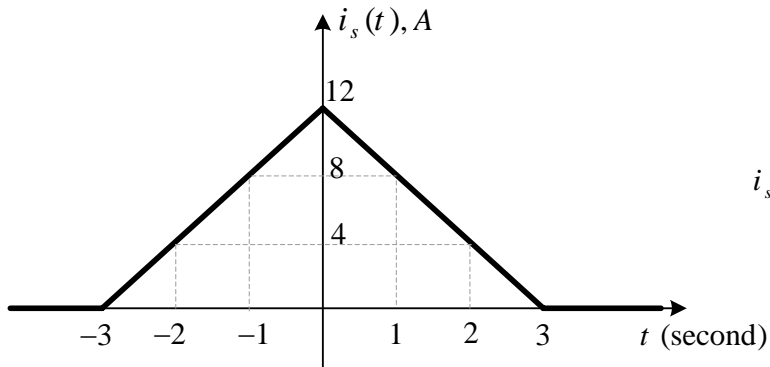| ANSWERS	
i) For $t < 0$, $v_o(t) =$	**ii)** For $t \geq 0$, $v_o(t) =$
iii) Plot of $v_o(t)$	

Problem 2 (b) [7 pts]

In the given circuit, the variation of the current $i_s(t)$ with time is shown graphically.

i) Find the time *instants* at which the energy stored in the 5 H inductor equals 40 J.

ii) Calculate the power in the 10 H inductor at $t = 1$ second. Is this power actually absorbed or actually delivered by the 10 H inductor?

Answers:

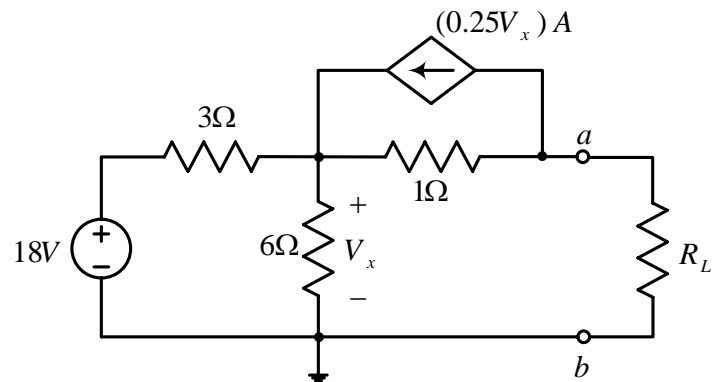**i)** Time instants in second =

ii) $P_{10H}(1) =$

Actually absorbed

Actually delivered

Problem 3 [20 pts]

As shown below, the load resistor R_L is connected to the circuit at terminals a and b.

a) Find the value of R_L that absorbs maximum power from the circuit.

b) Calculate the open circuit voltage between the terminals a and b.

c) Calculate the maximum power absorbed by R_L.

Answers:

a) $R_L =$

b) $V_{oc} =$

c) $P_{max} =$