Name:	Roll no.	A	U	2						Marks /40

Write your answers on this sheet. Additional sheets will not be provided. Answer all questions. Close book. Non-programmable scientific calculators allowed.

[1 Mark]

Q1. Select the correct option.

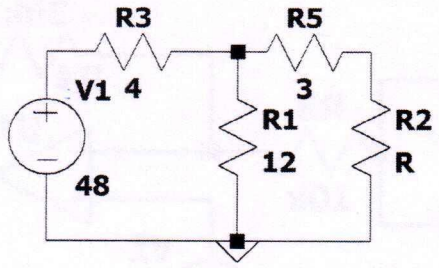
OPAMP has

(a) Low input resistance and low output resistance
(b) Low input resistance and high output resistance
(c) High input resistance and low output resistance
(d) High input resistance and high output resistance

[6 Marks]

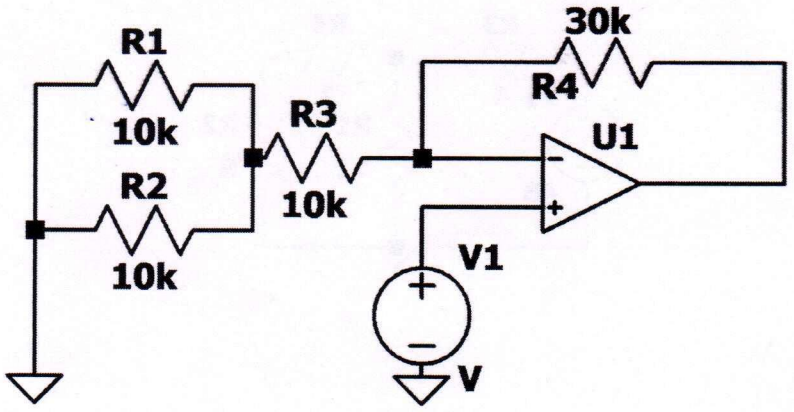
Q2. In the circuit below:

(a) Determine the current i through R2 when R2=6 Ohm [3 Marks]
(b) Determine the value of R2 to have current i=4A [3 Marks]



[3 Marks]

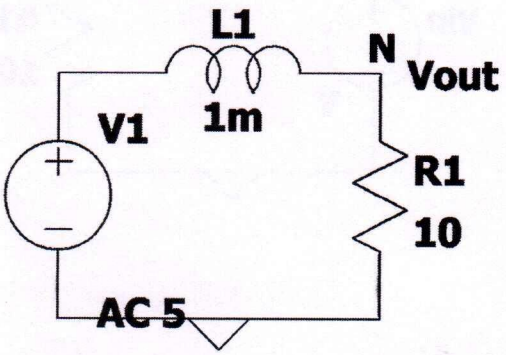
Q3. What is the voltage output of Operational amplifier in the following circuit if value of V is $2Sin(\omega t + \pi/6)$?



[7 Marks]

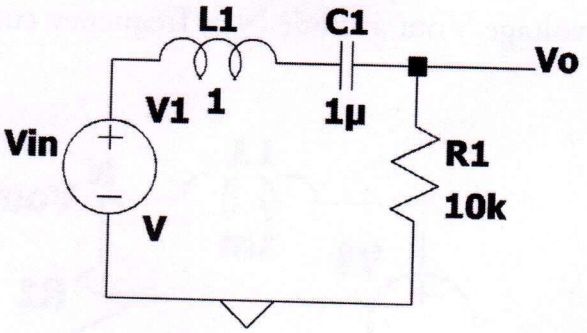
Q4. Consider the circuit below and answer the following questions.

(a) Is it a low pass or high pass filter? [1 Mark]
(b) What is the cut off frequency f_c (3dB point) for this filter? [2 Marks]
(c) What is voltage Vout at node N at frequency f=0Hz? [2 Marks]
(d) What is voltage Vout at node N at frequency cut off frequency f_c? [2 Marks]



[4 Marks]

Q5. In the circuit below, at which frequency f_o, the output V_o is maximum? What is the output voltage at f_o?



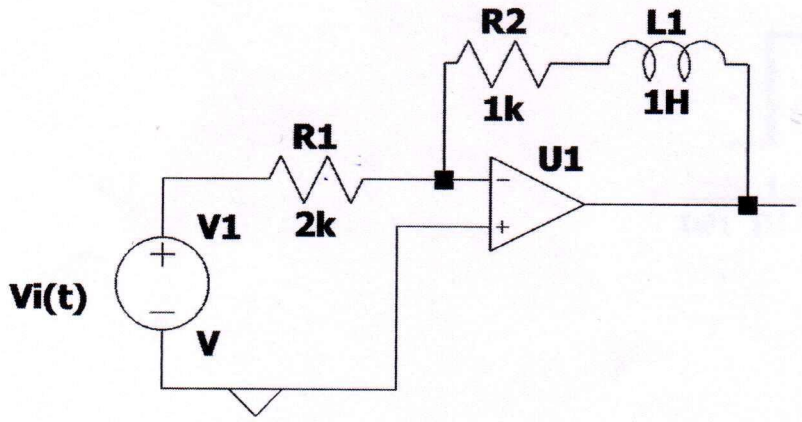
[3 Marks]

Q6. If a current I=$10Sin(\omega t+30)$ is flowing through impedance Z=$5Sin(\omega t+15)$. What is the voltage across impedance Z?

[6 Marks]

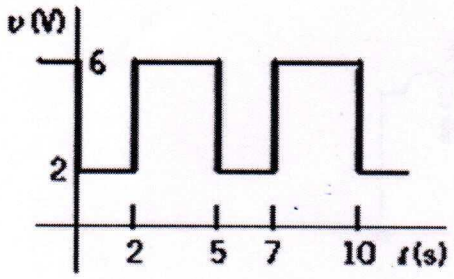
Q7. In the circuit below Vi(t)= $5Sin(1000t+30)$

Calculate the output voltage Vo(t) in polar form.



[5 Marks]

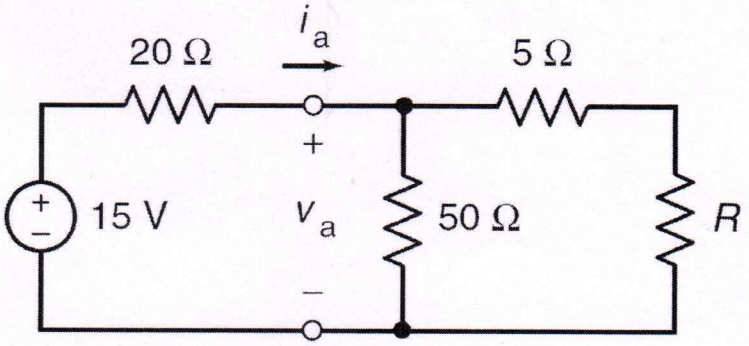
Q8. Determine the rms value of the waveform (voltage vs time in seconds) shown below.



[5 Marks]

Q9. Find the value of R that maximizes the power $P_a = v_a i_a$.

Also calculate the value of this maximum power P_a.



Rough Work

Rough Work