

NAME:

Final Exam

Circuits

Duration: 180 minutes

Except when stated otherwise, you should justify all your answers.

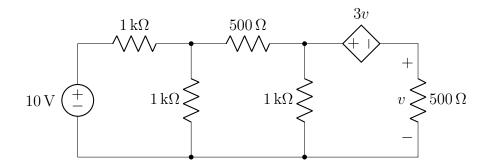
Your application of circuit analysis methods will be evaluated and it will reward you with more points than the final answer.

All the values should be given with a unit.

Circuits Page 1 of 9



Exercise 1 - DC Analysis



ullet By the method of your choice, determine the voltage v.

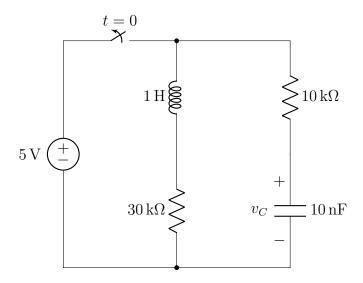
Circuits Page 2 of 9



Circuits Page 3 of 9



Exercise 2 - Transient analysis



• Determine $v_C(t)$ for $t \geq 0$.

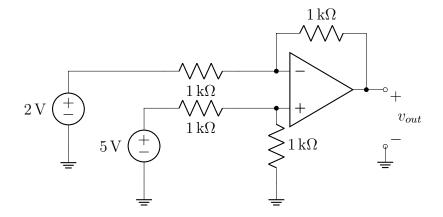
Circuits Page 4 of 9



Circuits Page 5 of 9



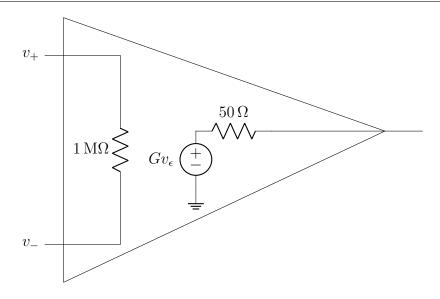
Exercise 3 - Op amp



- \bullet Considering an ideal op amp, determine $v_{out}.$
- ullet Considering a real model for the op amp, given in next page, determine v_{out} .

Circuits Page 6 of 9

Realistic model of op amp



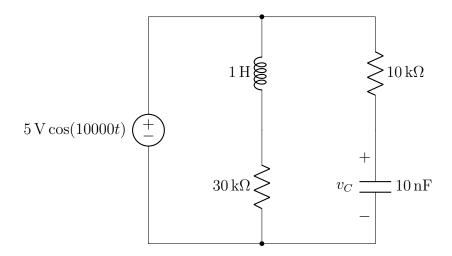
$$G = 100000$$

$$v_{\epsilon} = v_{+} - v_{-}$$

Circuits Page 7 of 9



Exercise 4 - Sinusoidal analysis



 \bullet Determine the sinusoidal steady-state voltage $v_C(t).$

Circuits Page 8 of 9



Circuits Page 9 of 9