UNIVERSIDAD DE ALCALÁ	**Escuela Politécnica Superior** **Departamento de Teoría de la Señal y Comunicaciones** **Grados TIC**
	Asignatura: Análisis de Circuitos (PEI-1)
	Curso: 1º. Grupo: E
	Name:
	Surname:
	D.N.I.:
	Fecha: 07 of March of 2018

Exame type: A

PEI-1. Test (5 points)
Instructions

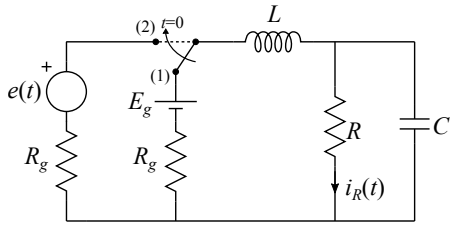
1. The five questions of the test are graded as follows:
   - Correct answer: 1 point.
   - Incorrect answer: $-\frac{1}{3}$ of a point.
   - No answer: 0 points.
2. The answers to the questions have to be marked in the following table. Mark with a cross the right answers and draw a circle on the cross to cancel it. The answers not marked on the table will not be considered.

ANSWERS TO THE TEST

Question \ Answer	**a**	**b**	**c**	**d**
Question 1				
Question 2				
Question 3				
Question 4				
Question 5				

Questions

1. In the circuit of the figure, the switcher is in position (1) since $t = -\infty$. At $t = 0$ it changes to position (2), remaining on this position.



DATA: $E_g = 10\,V$; $e(t) = 10 \cdot e^{-2t} \cdot \cos(3t)\,V$; $R_g = R = 5\,\Omega$; $L = 1\,H$; $C = 2\,F$.
The value of the current through the resistance R at $t = 0^+$ $[i_R(t = 0^+)]$ is:

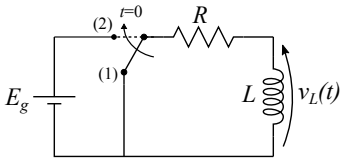
(a) $i_R(t = 0^+) = 0\,A$. ☐

(b) $i_R(t = 0^+) = 1\,A$. ☐

(c) $i_R(t = 0^+) = 2\,A$. ☐

(d) Can not be calculate with the given data. ☐

2. In the circuit of the figure, the switcher is in position (1) since $t = -\infty$. At $t = 0$ it changes to position (2), remaining on this position.



The value of the voltage at the coil at $t = 0^+$ is:

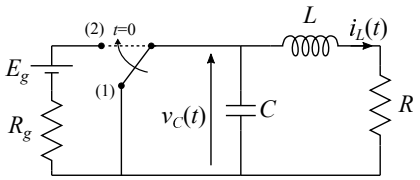
(a) $v_L(t = 0^+) = 0\,V$, since the value of the voltage at the coil does not change abruptly. ☐

(b) $v_L(t = 0^+) = 0\,V$, sinc the value of the current through the coil at $t = 0^+$ is zero. ☐

(c) $v_L(t = 0^+) = E_g$. ☐

(d) $v_L(t = 0^+) = \frac{E_g}{R}$. ☐

3. In the circuit of the figure, the switcher is in position (1) since $t = -\infty$. At $t = 0$ it changes to position (2), remaining on this position.



which of the following affirmations is the correct one?

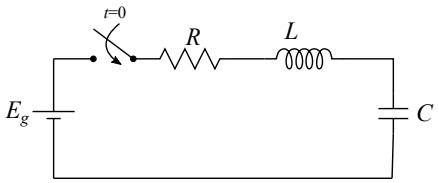
(a) The voltage at the capacitor, $v_C(t)$, is zero at $t = 0$ and $\frac{E_g \cdot R}{R_g + R}$ for $t \to \infty$ ☐

(b) The initial conditions of the two elements that store energy are different than zero. ☐

(c) The current trough the coil, $i_L(t)$, is zero for $t = 0$ and also for $t \to \infty$. ☐

(d) The voltage at the capacitor, $v_C(t)$, is zero for $t = 0$ and also for $t \to \infty$. ☐

4. In the circuit of the figure, where $R_g = R$, there is no energy stored before the switcher is closed. It is known that $L = 10^{-1}$ H and $C = 10^{-3}$ F.



Which value should have R so that the circuit becomes critically damped?

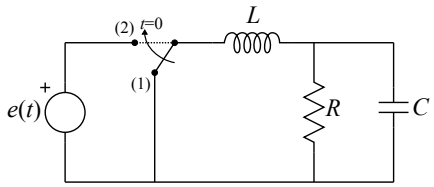
(a) $R = 0\ \Omega$. ☐

(b) $R = 5\ \Omega$ ☐

(c) $R = 20\ \Omega$. ☐

(d) $R = 10\ \Omega$ ☐

5. In the circuit of the figure, the switcher is in position (1) since $t = -\infty$. At $t = 0$ it changes to position (2), remaining in this position. Under these conditions the damping ratio of the circuit is $\xi = 1$.



If the value of the resistance R is doubled:

(a) The damping coeficient will not changed ($\xi = 1$) ☐

(b) The damping coeficient will increase ($\xi > 1$) ☐

(c) The damping coeficient will decrease ($\xi < 1$). ☐

(d) The damping coeficient can not be predicted without knowing $e(t)$. ☐

Answer Key for Exam A

1. (b)
2. (c)
3. (a)
4. (d)
5. (c)