Academic year 2018/2019

Electrical Circuits (2)

2nd year elec.

CHAPTER 3:

SECOND ORDER CIRCUITS

Prepared by: **Dr. Ahmed Refai**

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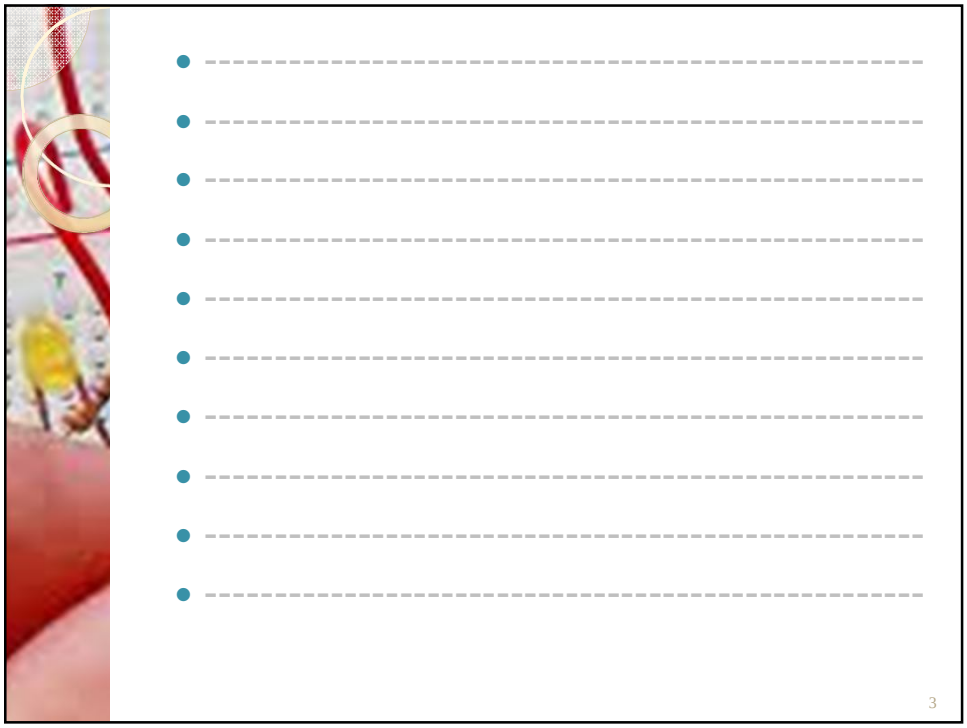
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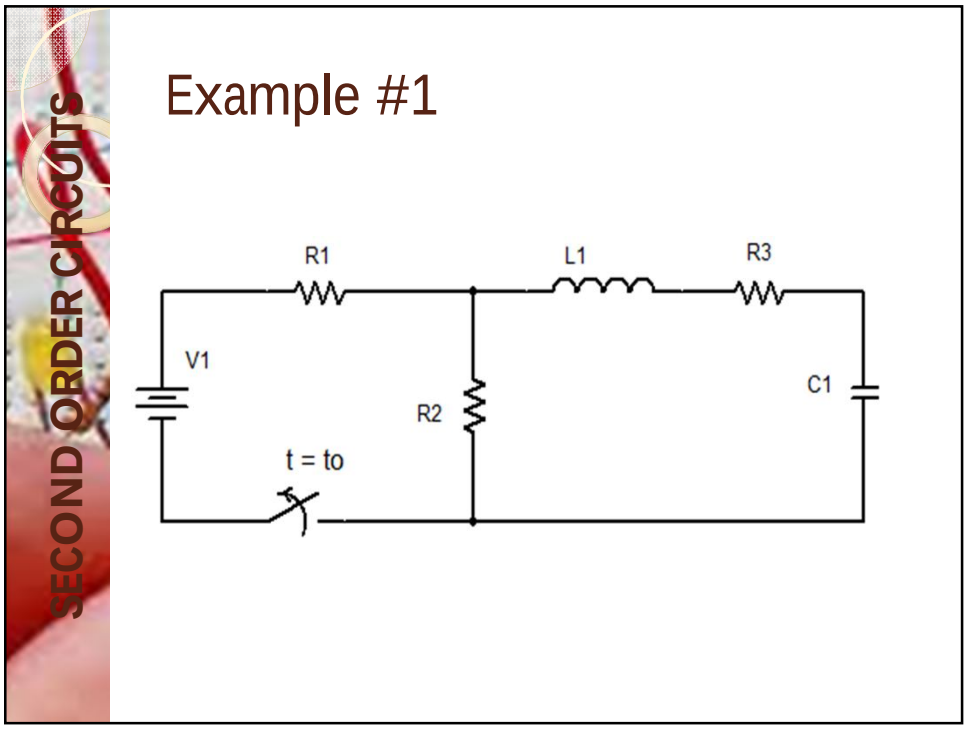
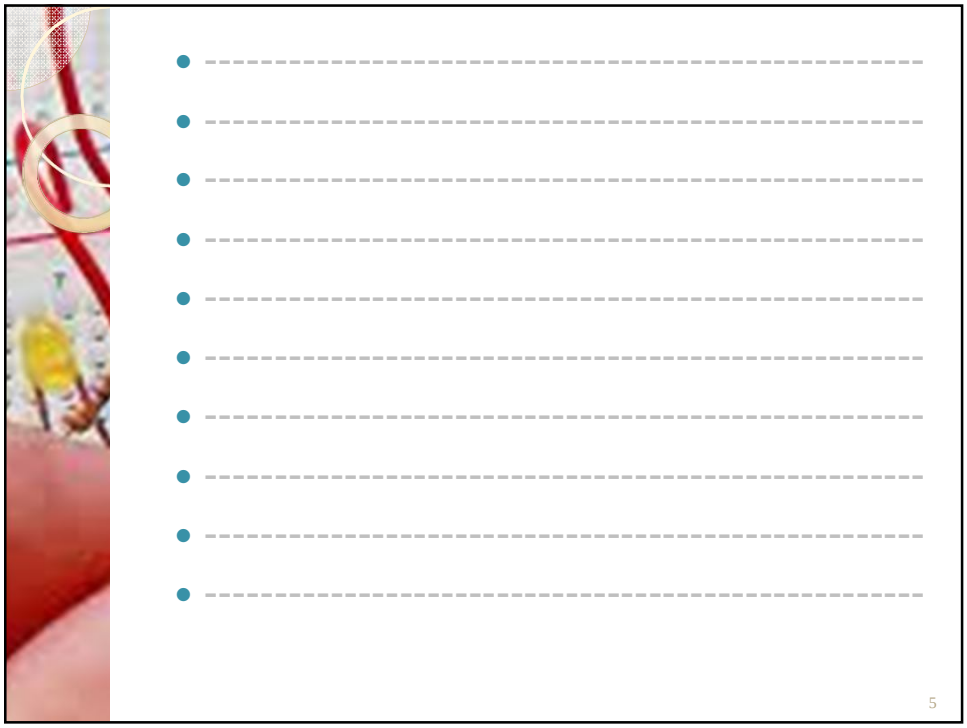
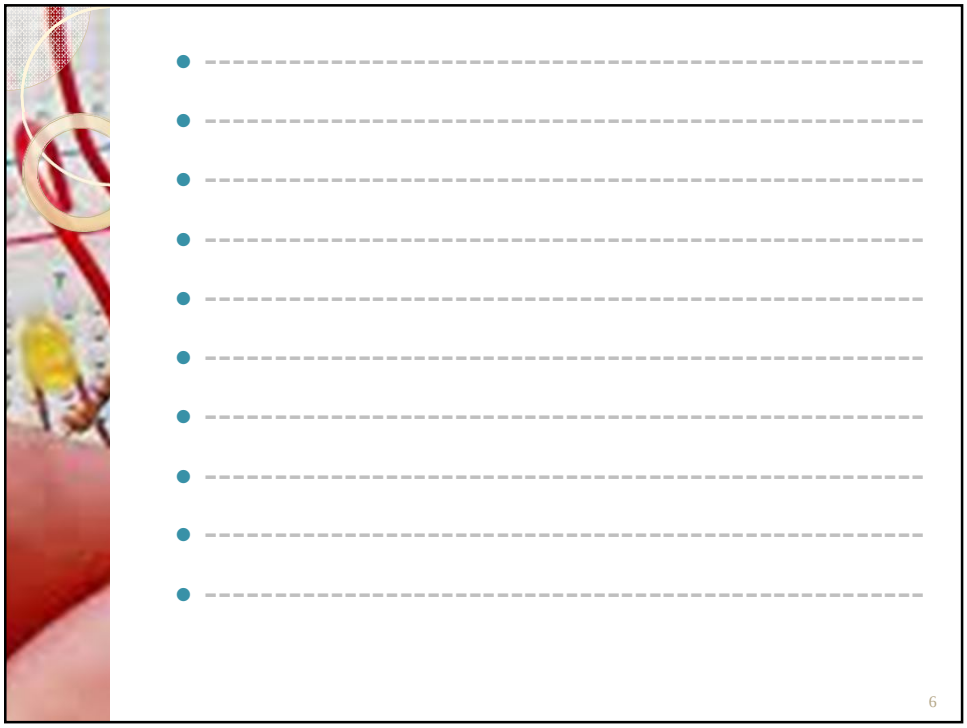

SECOND ORDER CIRCUITS
Example #1
R1
L1
R3
V1
R2
C1
t = to

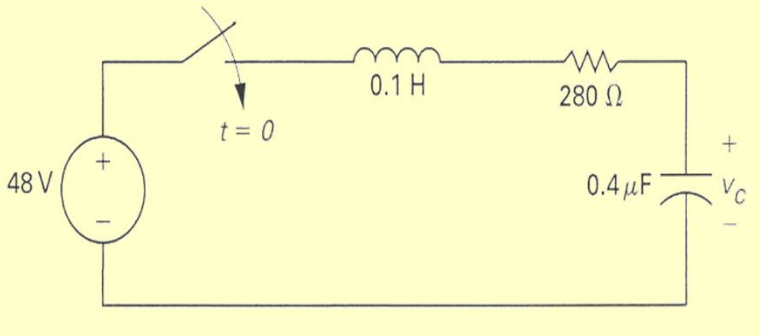


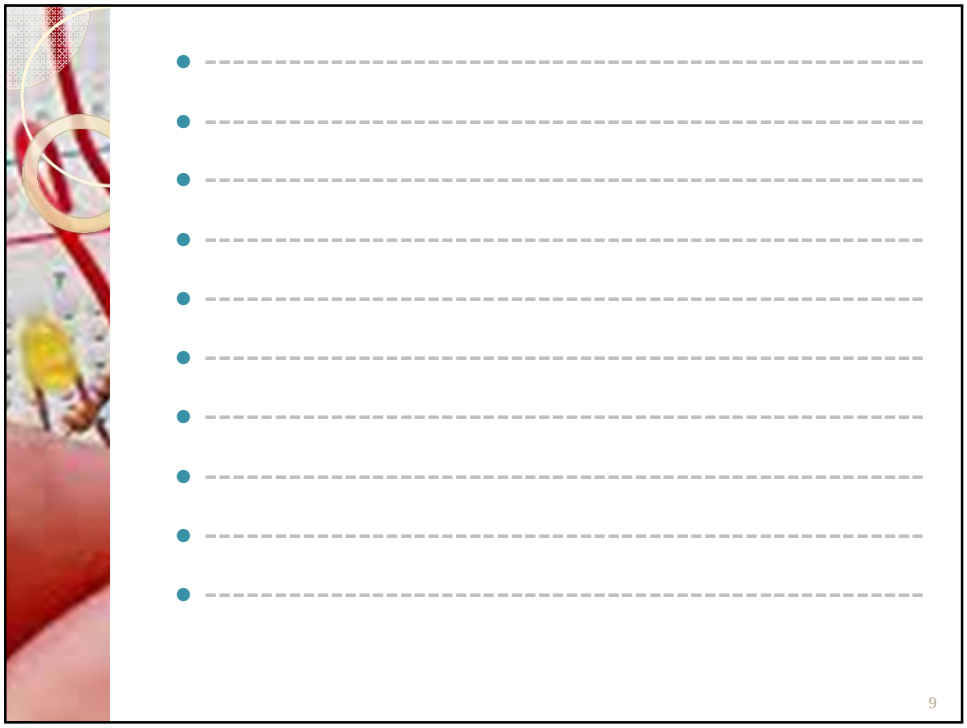


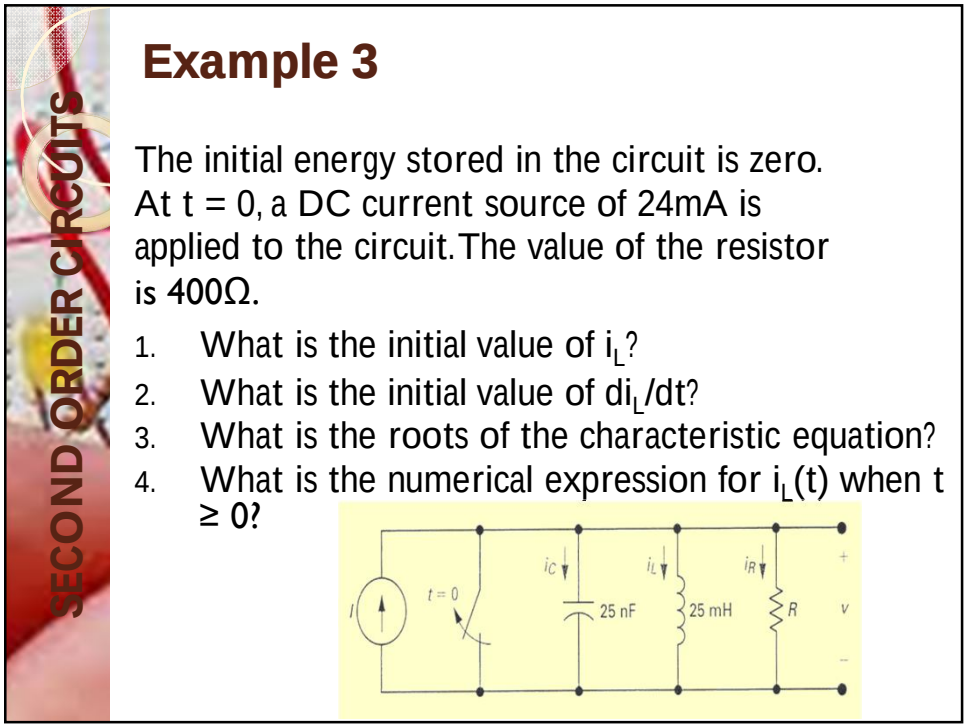
SECOND ORDER CIRCUITS

Example 2

No energy is stored in the 100mH inductor or 0.4μF capacitor when switch in the circuit is closed. Find $v_c(t)$ for $t \geq 0$.



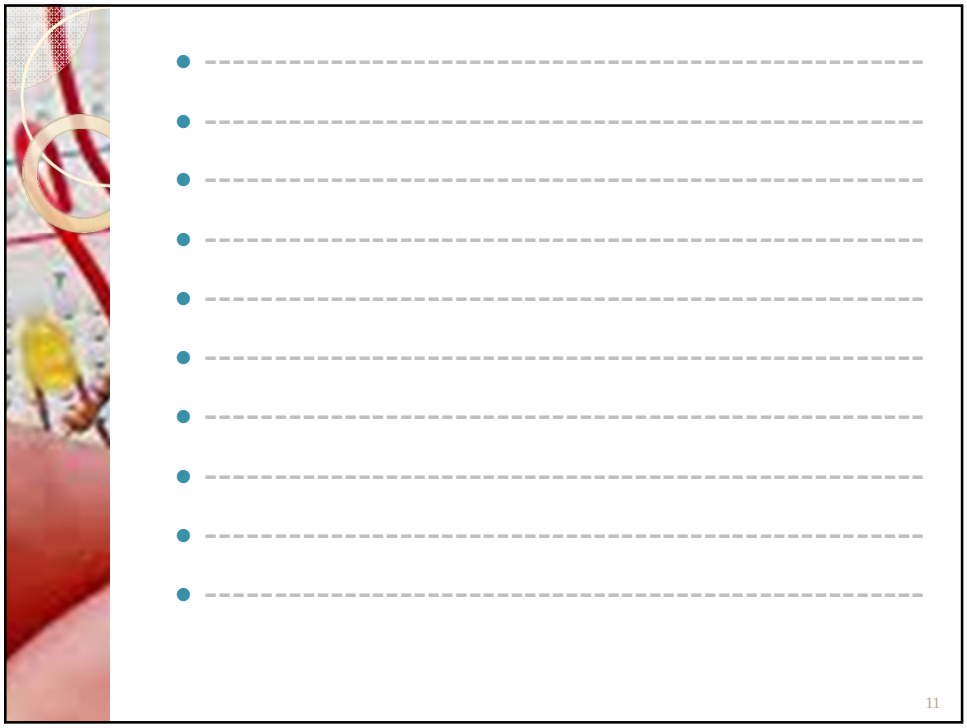


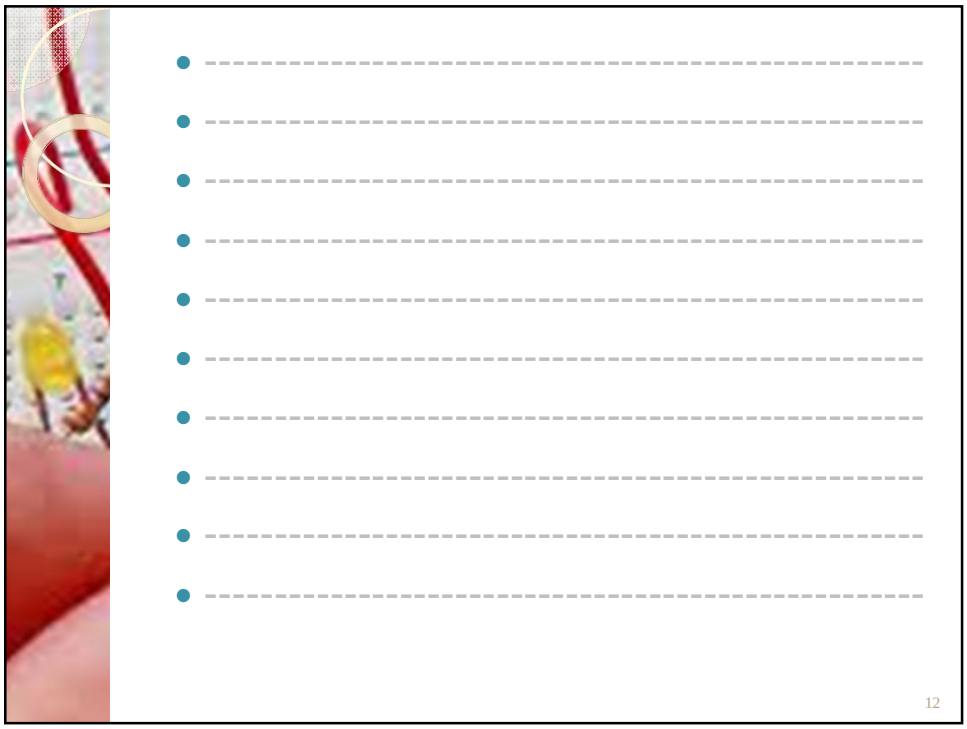


Example 3

The initial energy stored in the circuit is zero. At t = 0, a DC current source of 24mA is applied to the circuit. The value of the resistor is 400Ω.

1. What is the initial value of i_L?
2. What is the initial value of di_L/dt?
3. What is the roots of the characteristic equation?
4. What is the numerical expression for $i_L(t)$ when $t \geq 0$?

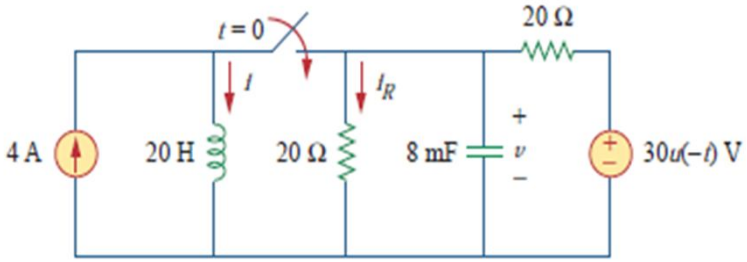


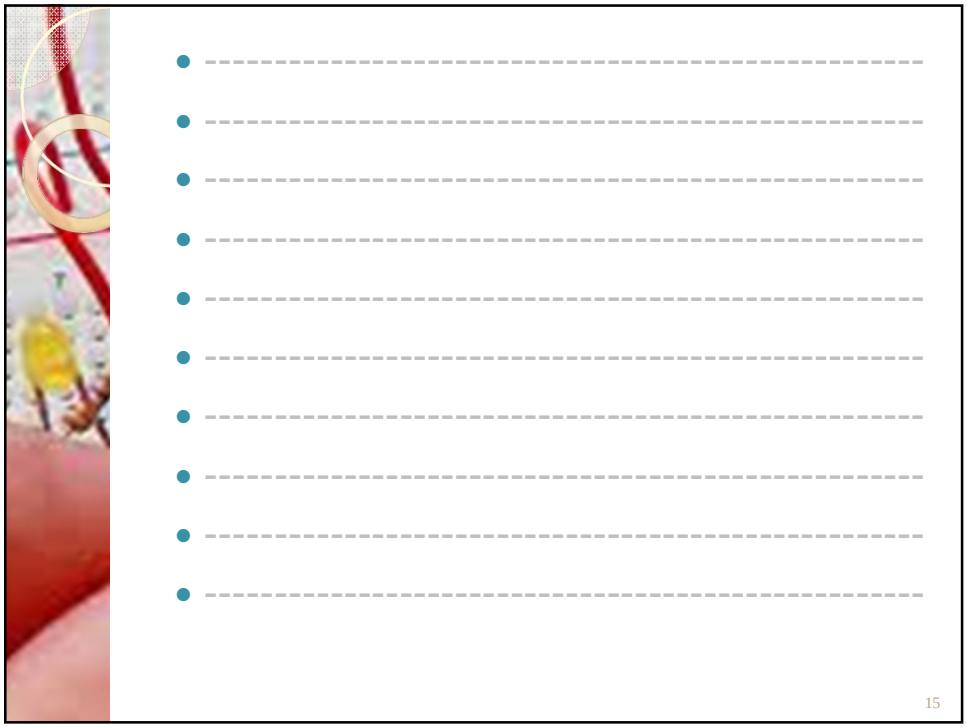


SECOND ORDER CIRCUITS

Example 4 (ex.3.5 in book)

In the circuit shown, find $i(t)$ and $i_R(t)$ for $t > 0$.

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