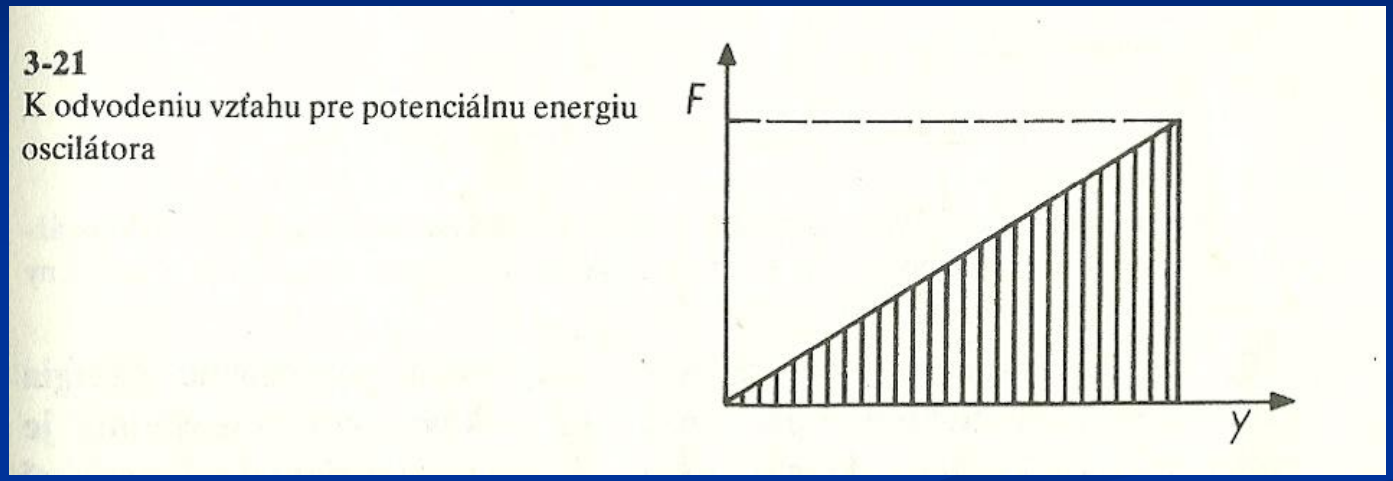
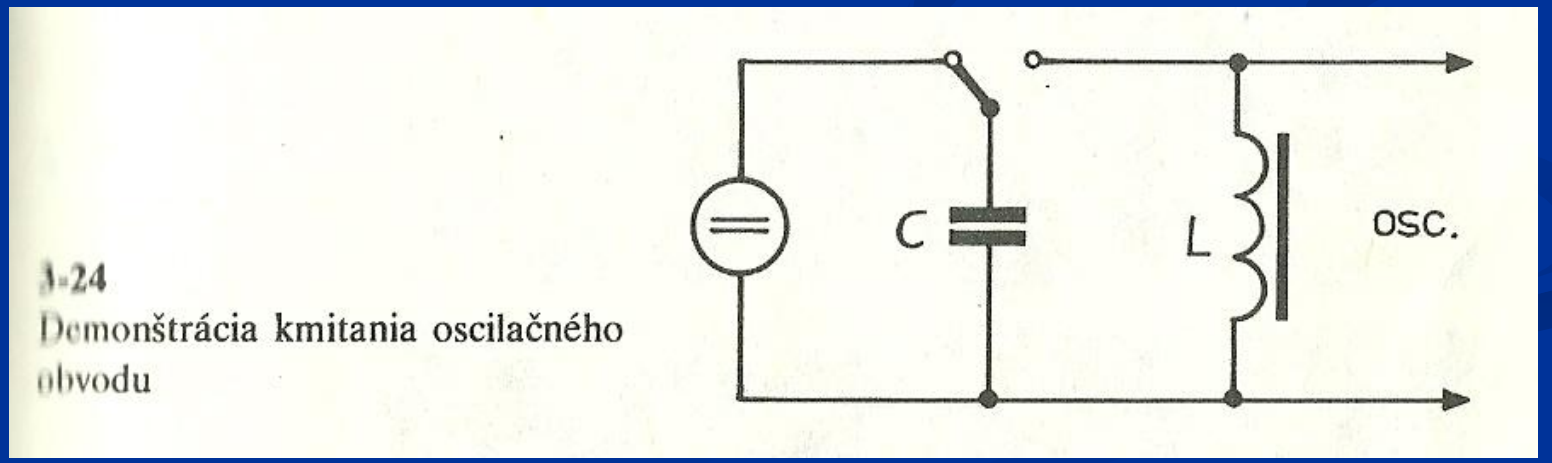
Energy of an oscillator

Work done by oscillator:

$$W = \tfrac{1}{2} F y = \tfrac{1}{2} k y^2$$



3-21
K odvodeniu vzťahu pre potenciálnu energiu oscilátora



3-24
Demonštrácia kmitania oscilačného obvodu

Comparision

- Mechanic oscillator
- deflection – y
- velocity – v
- PE: $E_p = ½ ky^2$
- KE: $E_K = ½ m v^2$
- force – F
- mass – m
- spring constant – k= F/y
- period: $T = 2\pi\sqrt{(m/k)}$

- Electromagnetic oscillator
- charge – Q
- current – I
- Electric energy: $E_e = ½ QU = ½ Q^2/C$ (C= Q/U)
- Magnetic energy: $E_m = ½ LI^2$
- p.d.
- inductance
- 1/C (C – capacity)
- $T = 2\pi\sqrt{(LC)}$

- Calculate period of the oscillations of the curcuit with parametres:
- a) C = 50 μF (micro farrad), L = 50 H
- b) C = 0.2 μF, L = 0.79 H
- c) C = 6 nF, L = 11 μH

In which case can we hear the oscillations? (16 Hz – 20 kHz)