الجامعة اللبنانية

كلية الصحة العامة

مباراة الدخول 2020 – 2021

مسابقة في مادة الفيزياء

المدة : ٤٥ دقيقة

عدد الصفحات: 2

**For each question, circle the correct answer (only one answer is correct):**

١. An object of mass m = 80 kg travels a distance of 10 m in free fall in air with a speed V = 10 m/s. Take g = 10 m/s$^2$.
a. The variation of the kinetic energy is $\Delta E_k$ = 4000 J.T
b. The variation of the gravitational potential energy is $\Delta E_P$ = -$\Delta E_k$.
c. The variation of the mechanical energy is $\Delta E_m$ = -8.10$^3$ J.

٢. A skater of mass M = 70 kg is at rest in the center of a place. A ball of mass m = 2 kg is launched with a speed v = 10 m/s toward him. The ball is caught by the skater and the system (skater, ball) starts its motion without friction. The speed of the system (skater-ball), after the collision is:
a. V = 0.28 m/s
b. V = 10 m/s
c. V = 3.6 m/s

٣. The characteristics of an elastic horizontal oscillator are:
Stiffness k = 10 N/m, mass m = 400 g, maximum speed $V_{max}$ = 0.5 m/s. All types of friction are neglected. Its amplitude is:
a. A = 10 cm
b. A = 20 cm
c. A = 5 cm

4. The induced flux in a surface varies according to the following equation: $\varphi$ = -5t$^2$ + 20t - 5. The induced e.m.f. at t = 2 s is:
a. e = 0 V
b. e = 8 V
c. e = 0.8 V

5. A coil of inductance L = 30 mH, is traveled by a current that varies by a current that varies as shown in the adjacent figure:
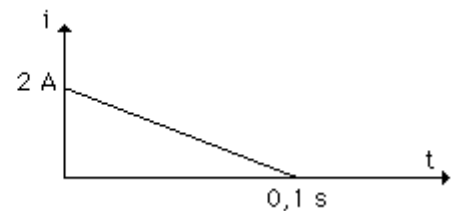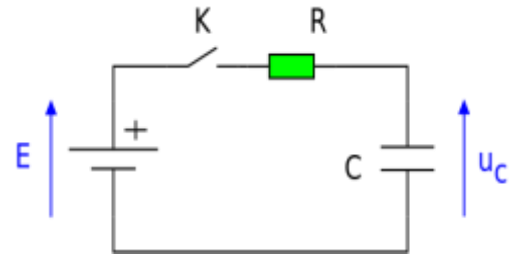


The induced electromotive force e.m.f. that appears across the coil is:

a. e = 0.6 V
b. e = -0.6 V
c. e = 0.06 V

6. A capacitor of capacitance C = 1000 µF is charged with a battery having a voltage E = 10 V using a resistance R = 10 kΩ. At t = 0, the switch is closed. At t = 10 s, the potential difference across the capacitor $u_c$ is:
a. $u_c$ = 3 V
b. $u_c$ = 6.3 V
c. $u_c$ = 10 V

7. A circuit is fed by a generator having alternating sinusoidal voltage u = $10\sqrt{2}$ sin (100πt + π/4), (u in V and t in s). The instantaneous intensity is i = $20\sqrt{2}$ sin(100πt) (i in A and t in s). The average power delivered to the circuit is:
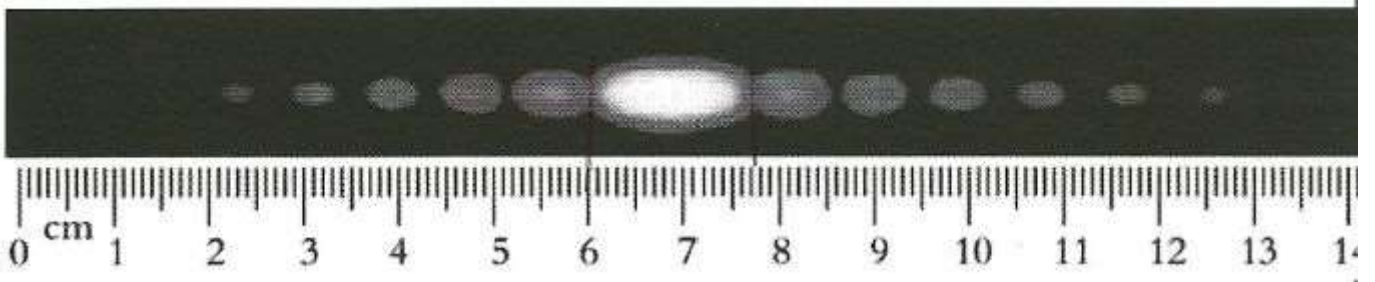a. P = 100 W
b. P = 200 W
c. P = $100\sqrt{2}$ W

8. A RLC circuit is fed by a generator having an alternating sinusoidal voltage u. The intensity of the current passes by a maximum at a resonance frequency of 1000 Hz. Given that the capacitance of the capacitor is 10 µF (Take $\pi^2$ = 10), the inductance L of the coil is:
a. L = 10 mH
b. L = 25 mH
c. L = 2.5 mH

9. When light passes from a medium to another medium having a different refraction index:
a. The frequency of light is changed.
b. The wavelength of light is changed.
c. The color of light is changed.

10. The diffraction in the adjacent figure is obtained by lighting a slit with a laser of wave length λ = 632 nm. This figure is realized on a screen placed at a distance D = 70 cm from the slit.

The width of the slit is:
a. a = 26 µm
b. a = 34 µm
c. a = 52 µm