LEBANESE UNIVERSITY
FACULTY OF EDUCATION

ENTRANCE EXAM
September, 2019
Duration: 2 hours

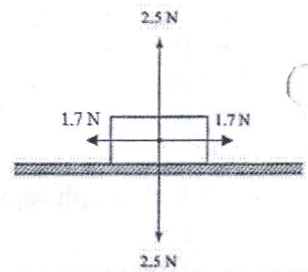
Science Exam

This exam is composed of three parts:
Part I: Physics
Part II: Chemistry
Part III: Life science

Part I - Physics

Answer the physics questions on the attached "Physics Answer Sheet" by crossing the letter that corresponds to the right answer.

1. The diagram below represents a block sliding across a table on a rectilinear pathway. The block is moving to the right. The velocity of the block during its motion:



   a. is nil.

   b. remains constant and is different from zero.

   c. increases.

   d. decreases.

2. If the sign of work is negative,

   a. the displacement is perpendicular to the force.

   b. the displacement is in the opposite direction to the force.

   c. the displacement is in the same direction as the force.

   d. no work is done.

3. Which of the following energy forms is associated with an object due to its position?
   a. potential energy
   b. positional energy
   c. total energy
   d. kinetic energy

4. Ball A has double the mass and speed of ball B. What is the ratio of the kinetic energy of ball A to ball B?

   a. 8

   b. 6

   c. 9

   d. 27

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10. Sound waves is slowest in
   a. gas.
   b. liquid.
   c. solid.
   d. None of the above.

11. If the pendulum completes exactly 12 cycles in 2.0 min, what is the frequency of the pendulum?
   a. 0.1Hz
   b. 0.17 Hz
   c. 6 Hz
   d. 10 Hz

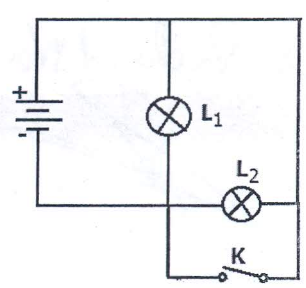
12. When a sound waves travel from air into water, which property of the wave remains unchanged?
   a. speed
   b. frequency
   c. wavelength
   d. amplitude

13. If a ^{14}C has a half-life of 5730 years, then how long will it take for quantity of ^{14}C in a sample to drop to 1/8 of initial quantity?
   a. 0.19×10^4 years
   b. 1.44×10^4 years
   c. 1.72×10^4 years
   d. 2.58×10^4 years

14. How is light affected when it passes from less to more refractive medium?
   a. Its frequency increases.
   b. Its frequency decreases.
   c. Its speed increases.
   d. Its speed decreases.

15. During the passage of light from air to water, if the incident angle is non-zero, it is:
   a. Strictly greater than the angle of refraction
   b. Strictly less than the angle of refraction
   c. Equal to the angle of refraction
   d. None of the above

16. What happens when the switch K is closed in the adjacent circuit?
   a. Lamp L_1 lights because current from the battery flows through it while lamp L_2 goes out.
   b. Lamps L_1 and L_2 lights normally because current from the battery flows through both lamps.
   c. Lamp L_2 lights because current from the battery flows through it while lamp L_1 goes out.
   d. Both lamps go out, because the battery terminals connect to each other.



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17. Tripling the current in a circuit with constant resistance has the effect of changing the power by what factor?
    a. $\frac{1}{9}$
    b. 3
    c. $\frac{1}{3}$
    d. 9
18. A color TV draws about 2.5 A when it is connected to a 220 V outlet. Assuming electrical energy costs 400 LBP per kW•h, what is the cost of running the TV for exactly 8 h?
    a. 500 LBP
    b. 1000 LBP
    c. 1760 LBP
    d. 2230 LBP

19. Two resistors having the same resistance value R are wired in parallel. How does the equivalent resistance R_e compare to the resistance value R of a single resistor?
    a. $R_{eq} = 2R$.
    b. $R_{eq} = R$.
    c. $R_{eq} = \frac{R}{2}$.
    d. $R_{eq} > R$

20. What effect will be produced on a capacitor if the separation between the plates is increased?
    a. It will increase the charge.
    b. It will increase the capacitance.
    c. It will decrease the charge.
    d. It will decrease the capacitance.

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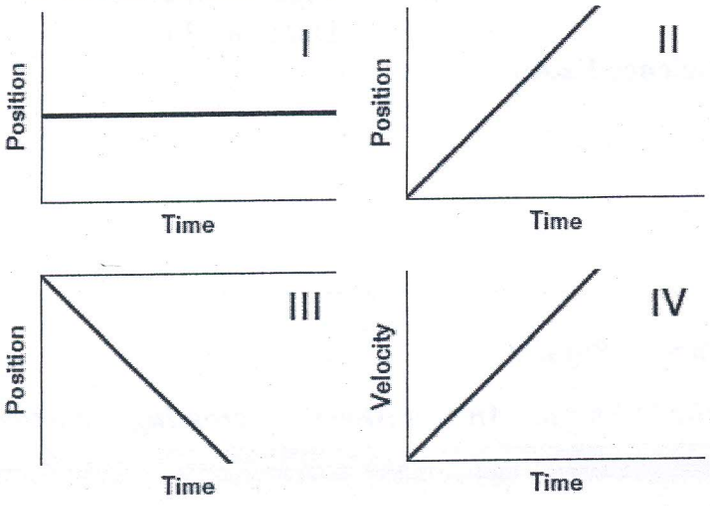
Use the graphs below to answer questions 5, 6 and 7.

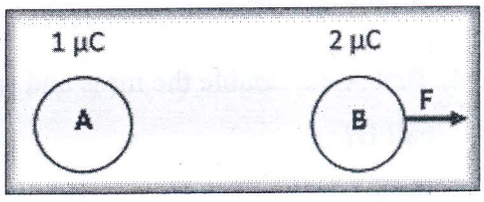


5. Which graph represents an object moving with a constant positive velocity?
   a. I
   b. II
   c. III
   d. IV

6. Which graph represents an object at rest?
   a. I
   b. II
   c. III
   d. IV

7. Which graph represents an object moving with constant positive acceleration?
   a. I
   b. II
   c. III
   d. IV

8. Two metal spheres, A and B, possess charges of 1 μC and 2 μC respectively. In the adjacent figure. arrow $\vec{F}$ represents the electrostatic force exerted on sphere B by sphere A. Which arrow represen the magnitude and direction of the electrostatic force exerted on sphere A by sphere B?



   a. $\vec{F}$
   b. $-\vec{F}$
   c. $2\vec{F}$
   d. $-2\vec{F}$

9. In a vacuum, all electromagnetic waves have the same:
   a. speed.
   b. frequency.
   c. phase.
   d. wavelength.

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