

MEA Physics Test
Sample Items on Various Topics

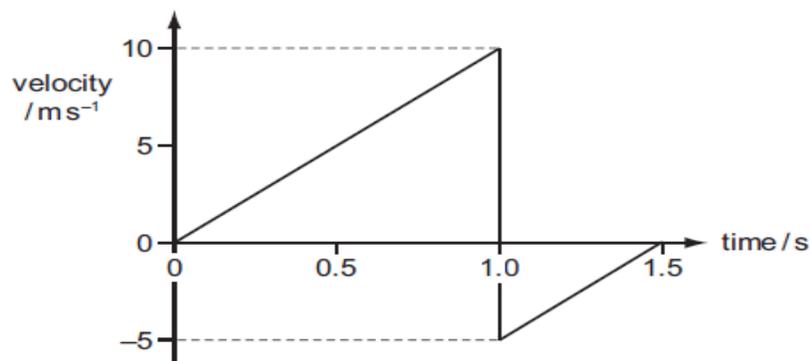
I- Realm of Physics

1. Which definition is correct and uses only quantities rather than units?

- A. Density is mass per cubic meter.
- B. Potential difference is energy per unit current.
- C. Pressure is force per unit area.
- D. Speed is distance travelled per second.

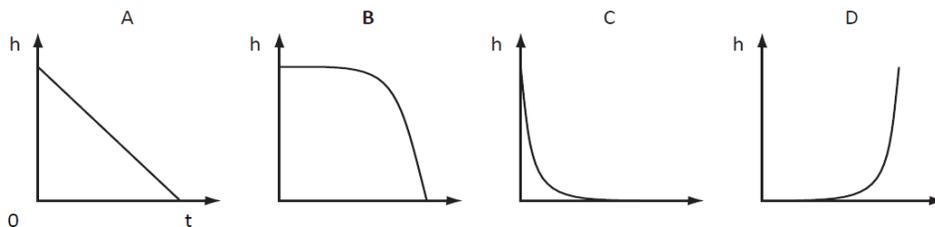
II- Mechanics

2. A ball is released from rest at time zero. After 1.0 s it bounces inelastically from a horizontal surface and rebounds, reaching the top of its first bounce after 1.5 s.



What is the total displacement of the ball from its original position after 1.5 s?

- A. 1.25 m
 - B. 3.75 m
 - C. 5.00 m
 - D. 6.25 m
3. A small steel ball falls freely under gravity after being released from rest. Which graph best represents the variation of the height h of the ball with time t ?



4. **The unit of work, joule, is dimensionally the same as which of the following?**
- A. N/s
 - B. N/kg
 - C. N . s
 - D. N.m
5. **A cart, accelerating from rest at constant rate, experiences a displacement of 44 m in 20 s. What is the average velocity?**
- A. 1.1 m/s
 - B. 2.2 m/s
 - C. 4.4 m/s
 - D. zero

III- Thermal heat

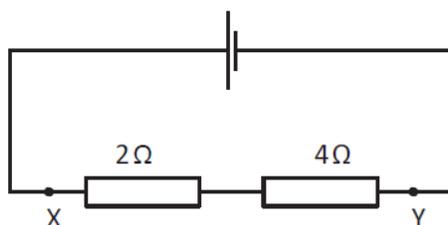
6. **What is the internal energy of an object?**
- A. It is the energy associated with the object's movement through space.
 - B. It is the energy associated with the random movement of the molecules in the object.
 - C. It is the energy due to the attractions between the molecules in the object.
 - D. It is the sum of all the microscopic potential and kinetic energies of the molecules in the object.
7. **Which process does not require energy to be supplied?**
- A. Boiling
 - B. Evaporation
 - C. Freezing
 - D. Melting
8. **Which one of the choice below describes a system made up of ice, water and steam existing together?**
- A. Absolute Zero
 - B. Triple point
 - C. Ice point
 - D. Steam point

IV- Electricity & Electromagnetism

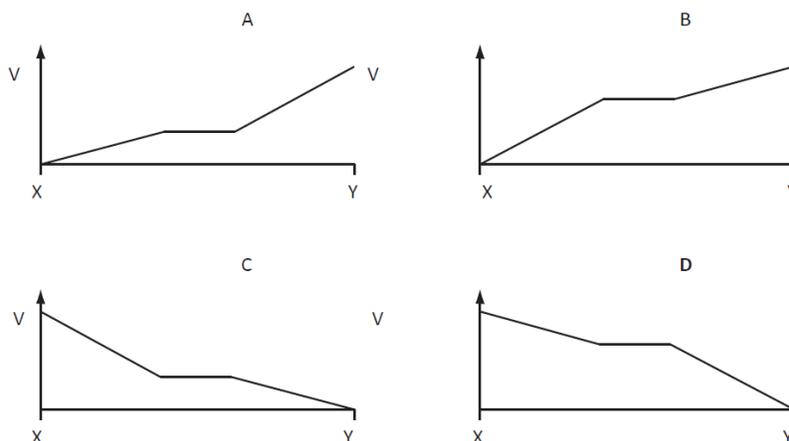
9. A battery is marked 9.0 V. What does this mean?

- A. Each coulomb of charge from the battery supplies 9.0 J of electrical energy to the whole circuit.
- B. The battery supplies 9.0 J to an external circuit for each coulomb of charge.
- C. The potential difference across any component connected to the battery will be 9.0 V.
- D. There will always be 9.0 V across the battery terminals.

10. A $2\ \Omega$ resistor and a $4\ \Omega$ resistor are connected to a cell.



Which graph shows how the potential V varies with distance between X and Y?



11. What is the maximum number of 100 W lightbulbs you can connect in parallel in a 120V home circuit without tripping the 20 A circuit breaker?

- A. 11
- B. 17
- C. 23
- D. 29

12. There is a magnetic force on a particle. It is possible that the particle is

- A. Uncharged
- B. Stationary
- C. not part of a wire
- D. moving in the direction of the magnetic field.

V- Optics

- 13. The phenomenon called “Looming” is similar to a mirage, except that the inverted image appears above the object instead of below it. What must be true if looming is to occur?**
- A. The temperature of the air must increase with distance above the surface.
 - B. The temperature of the air must decrease with distance above the surface.
 - C. The mass of the air must increase with distance above the surface.
 - D. The mass of the air must decrease with distance above the surface.
- 14. A person cannot see objects clearly beyond 25.0cm. What is the defect of her eye, and what glasses should be prescribed for her?**
- A. myopia, diverging lenses
 - B. myopia, converging lens
 - C. Hyperopia, diverging lens
 - D. Astigmatism, converging lens

VI- Aviation and Weather

- 15. The Pilot of a plane measures an air velocity of 165Km/h south relative to the plane. An observer on the ground sees the plane pass overhead at a velocity of 145 Km/h toward the north. What is the velocity of the wind that is affecting the plane relative to the observer?**
- A. 20 km/h to the north.
 - B. 20 km/h to the south.
 - C. 165 km/h to the north.
 - D. 410 km/h to the south.
- 16. Clouds, fog, or dew will always form when**
- A. water vapor condenses
 - B. water vapor is present
 - C. relative humidity reaches 100 percent
 - D. relative humidity is above 50%

Answer Key:

I-	1. C			
II-	2. B	3. B	4. D	5. B
III-	6. D	7. C	8. B	
IV-	9. A	10. D	11. B	12. C
V-	13. A	14. A		
VI-	15. D	16. A		