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 \cdot 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 Ω resistor and a 4 Ω 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 120 V 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.
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

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:

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