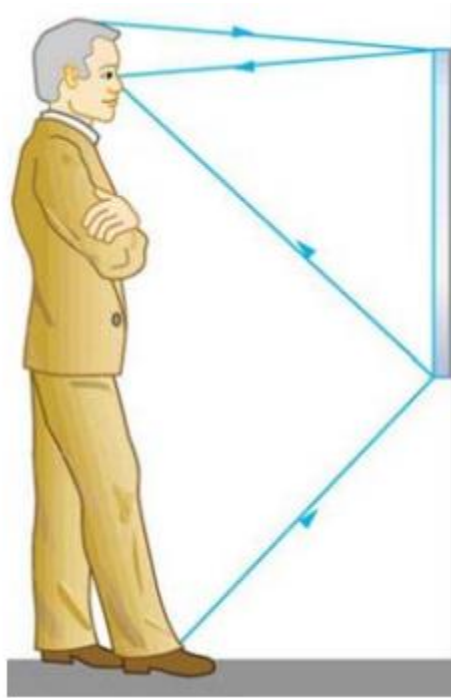


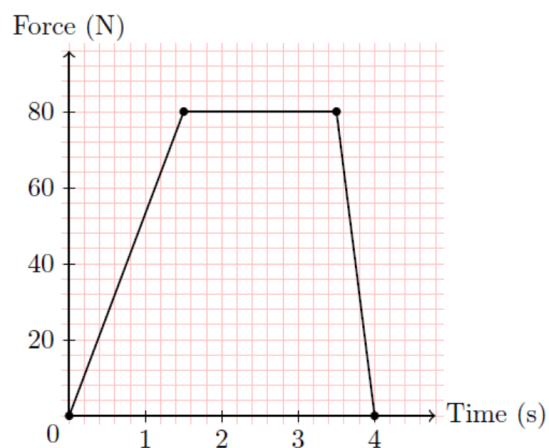
**ste=mc<sup>2</sup>** Sample Questions  
*Physico*

1. A 1.8 m tall man stands 1 m in front of a vertical plane mirror. His eyes are 12 cm below his forehead. What is the minimum height of the mirror, which allows the man to see his full height?



- A. 0.84 m
- B. 0.90 m
- C. 1.68 m
- D. 1.80 m

2. The figure shows a plot of the time-dependent force  $F(t)$  acting on a particle at rest. If the mass of the particle is 2 kg, what is the average force acting on the object during first 3 s?



- A. 20 N

- B. 40 N
- C. 60 N
- D. 80 N

3. Electromagnetic radiation comes in packets called photons. Every packet contains energy ( $E$ ) that depends on its frequency ( $f$ ) according to this formula.

$$E = h f$$

Where  $h$  is a constant called Planck Constant.

$f$  is related to the wavelength ( $\lambda$ ) and the speed of light ( $c$ ) as follows:

$$c = f \lambda$$

According to the above explanation which of the following statements is *not* always true?

- A. A photon with longer wavelength has less energy.
  - B. A photon of light with the same color has the same energy.
  - C. Beams of light with the same color but different intensity contain different numbers of photons.
  - D. Light with higher energy contains more photons.
4. Two spheres with positive charge repel each other with force proportional to their charge ( $q_1$ ,  $q_2$ ) and inversely proportional to the square of distance between their centers ( $r$ ).

$$F = k \frac{q_1 \cdot q_2}{r^2}$$

In the formula  $k$  is a proportionality constant.



If the tension of the rope between two balls above is  $T = 8 \text{ N}$ , what would be the tension if the distance between the spheres is doubled?

- A. 2 N
  - B. 4 N
  - C. 16 N
  - D. 32 N
5. In which of the following examples does an increase in internal energy take place?
- I. The temperature of wooden blocks drops by 20 %.
  - II. The speed of water molecules increases from 40  $m/s$  to 50  $m/s$ .
  - III. An ice cube at  $-30 \text{ }^\circ\text{C}$  is brought into a room at  $25 \text{ }^\circ\text{C}$ .



IV. An object is at 50 °C and its temperature is not changing.

- A. I and III
- B. I, II, and IV
- C. I and IV
- D. II and III



# Answers

1. B

2. C

3. D

4. A

5. D