1. If I accelerate forward from rest at a rate of 4 m/s^2, how fast will I be going after 6 seconds?
   - A. 0 m/s
   - B. 4 m/s
   - C. 6 m/s
   - D. 24 m/s
   - E. I have no idea!

D

2. If you are traveling at 30 m/s, and are asked to slow to a stop within a 3 second period, what will your acceleration be?
   - A. this is a deceleration, and not an acceleration
   - B. 3 m/s^2
   - C. 10 m/s^2
   - D. 30 m/s^2

C

3. If I want to accelerate a 50 kg mass at a rate of 0.4 m/s^2, how much net force should I apply?
   - A. 50 N
   - B. 30 N
   - C. 20 N
   - D. 10 N
   - E. 4 N

C

4. In applying 20 N of force over a distance of 5 meters, how much work was done?
   - A. 4 J
   - B. 5 J
   - C. 20 J
   - D. 100 J
   - E. no work was done

D

5. If 100 J of energy went into kinetic energy of 50 kg of mass, how fast did the mass end up going (reminder: $K.E. = ½mv^2$)?
   - A. 1 m/s
   - B. 2 m/s
   - C. 4 m/s
   - D. 5 m/s
   - E. 10 m/s

B

6. How much power does it take to carry a 20 kg box of books (plus your 60 kg mass) up three flights of stairs (30 m) in one minute? (hint: don't forget *g*)?
   - A. 10 Watts
   - B. 40 Watts
   - C. 100 Watts
   - D. 400 Watts
   - E. 24,000 Watts

D

1. How much kinetic energy would a large (10 kg) pendulum have at the bottom of its swing if it is released from a point 0.5 meters higher than the bottom of the swing?
   - A. I need to know the velocity to figure this out
   - B. 5 Joules
   - C. 50 Joules
   - D. 500 Joules
   - E. 5000 Joules

C

2. How fast will a pendulum (of any mass) go at the bottom of its swing if released from a point 1.25 m above the bottom of the swing?
   - A. I need to know the mass to answer this
   - B. 1 m/s
   - C. about 3.5 m/s
   - D. 5 m/s
   - E. 25 m/s

D

3. If I drop a 0.1 kg superball from a height of 2 meters, how much energy does it have?
   - A. 0.2 Joules
   - B. 1 Joule
   - C. 2 Joules
   - D. 20 Joules

C

4. If all the energy in the superball ends up heating the superball itself, with a heat capacity of 1000 J/kg/°C (remember, it has 2 J, and is 0.1 kg), how much does its temperature rise?
   A. dunno
   B. 1/100th °C
   C. 1/50th °C
   D. 1/10th °C
   E. 1/5th °C

C

5. 250 W for 50 minutes (3000 sec) is 750,000 J. If 1 Calorie ≈ 4000 J, and the body is only 25% efficient, how many Calories did Bryan have to eat?
   A. 20 Calories
   B. 80 Calories
   C. 200 Calories
   D. 800 Calories
   E. 2000 Calories

D

6. Since drag force is proportional to Av^2, do you win more by cutting area in half, or cutting velocity in half?
   A. both will do the same thing
   B. better off reducing velocity
   C. better off reducing area
   D. there will be no difference in reducing *either one*

B

2. I put two springs, side by side, on the table, one with $k = 2$ N/m, and the other with $k = 3$ N/m. I compress them both at once by 1 m. What force does it take?
   A. 6 N
   B. 5 N
   C. 2.5 N
   D. 1 N
   E. -1 N

B

3. If I quadruple the mass of the car on the air track, what will happen to the oscillation **period**?
   A. 16×
   B. 4×
   C. 2×
   D. ½×
   E. ¼×

C

2. How much stronger is the attraction between an oxygen nucleus and an electron than a hydrogen nucleus and an electron at the same separation?
   A. The force is the same
   B. The force is 4 times greater
   C. The force is 8 times greater
   D. The force is 16 times greater
   E. Indeterminant

C

3. How does the force between a neutron and a proton compare to the force between two protons at the same separation?
   A. The force is the same magnitude and direction
   B. The force is the same magnitude, opposite direction
   C. The force is half the magnitude, same direction
   D. The force is half the magnitude, opposite direction
   E. The force is zero

E

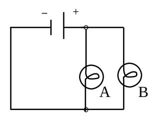
4. If I want to send a beam of electrons to the top of a TV screen using charges on parallel plates, which is the correct configuration?
   A. + on bottom, – on top; E-field points up
   B. + on bottom, – on top; E-field points down
   C. – on bottom, + on top; E-field points up
   D. – on bottom, + on top; E-field points down

D

5. What is the *central* condition necessary to make the bulb light up?
   A. Both ends of the wire have to touch the battery
   B. The bulb must touch the positive terminal of the battery
   C. The wire has to be in a loop geometry
   D. The bulb must be part of a closed loop of current
   E. There must be contact with both terminals of the bulb

D

6. How would the brightness of A change if B is unscrewed?
   A. A gets dimmer
   B. A stays the same
   C. A gets brighter
   D. unpredictable



B

1. A particular flashlight bulb is said to put out 2 Watts of power. If it is supplied with 3 Volts to accomplish this, what is its current?
   A. 0.5 Amps
   B. 0.67 Amps
   C. 1.5 Amps
   D. 2 Amps
   E. 3 Amps

B

2. Why do we use aluminum foil to keep food warm?
   A. Its emissivity is low, so it radiates little heat
   B. It reflects infrared radiation back to the food
   C. It inhibits air circulation
   D. It just protects us from burning ourselves
   E. It has nothing to do with keeping food warm

A, but B also

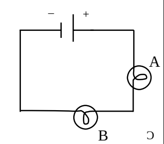
3. How efficient would you guess an incandescent bulb to be at generating visible light?
   A. 1%
   B. 10%
   C. 50%
   D. 80%
   E. 100%

B

4. If I apply 5 Volts to a circuit and measure the current to be 0.1 Amps, what is the resistance in the circuit?
   A. 0.5 Ω
   B. 2 Ω
   C. 5 Ω
   D. 20 Ω
   E. 50 Ω

E

5. Which bulb is brighter?
   A. A: it gets current first
   B. B: current is up to speed
   C. neither: same current
   D. neither light up
   E. Depends on length of wire

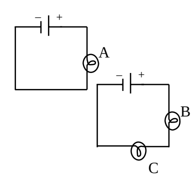


C

6. If I put 20 Volts across a 100 Ω resistor, how much current results?
   A. 0.2 Amps
   B. 2 Amps
   C. 5 Amps
   D. 2000 Amps
   E. Not enough information

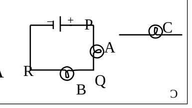
A

7. Rank the brightness:
   A. A = B = C
   B. A > B > C
   C. A > B = C
   D. B = C > A
   E. A < B < C



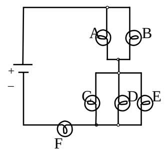
C

8. Where do we add C to make A brighter?
   A. P to Q
   B. P to R
   C. R to Q
   D. adding a bulb has to dim A
   E. adding a bulb won't change A



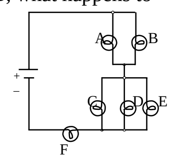
C

9. Rank brightness
    A. A=B > C=D=E > F
    B. C=D=E > A=B > F
    C. F > C=D=E > A=B
    D. F > A=B > C=D=E
    E. F > A > B > C > D > E



D

10. If I remove (disconnect) B, what happens to F?
    A. F gets brighter
    B. F stays the same
    C. F gets dimmer
    D. I can't predict…



C

1. Given that $V = IR$ and $P = VI$, which of the following is a correct expression for power?
    A. $P = VR$
    B. $P = V^2/R$
    C. $P = I^2R$
    D. $P = IR$
    E. B & C

E

2. If I apply 1.5 V to a light bulb rated to be a certain wattage (power) at 3.0 V, how much power will the light emit (assume the bulb is a fixed resistance)?
    A. It will emit no power
    B. It will emit one quarter of the power
    C. It will emit one half the power
    D. It will emit the same power
    E. I need to know the actual power to answer

B

3. If I double the current through a light bulb (treating as a fixed resistance), how does the power output change?
    A. Power stays the same
    B. Power doubles (2×)
    C. Power quadruples (4×)
    D. Power is unrelated to current
    E. I need to know the resistance and current to say

C

4. Given that power dissipation in the transmission line is $P = I^2R$, should we work on reducing current or resistance to lower the power lost?
    A. Either will have the same effect
    B. Better off reducing the resistance
    C. Better off reducing the current
    D. Neither will have an impact

C

5. If the power in the device we're using is $P = VI$, what can we do to lower the current but keep the same power in our device?
    A. Lower the voltage
    B. Raise the voltage
    C. This can't be done: you're stuck
    D. Reduce the resistance
    E. Increase the resistance

B

6. If I want to convert 120V AC into 12 V AC using a transformer, what coil ratio do I want?
    A. 1:1
    B. 6:1
    C. 10:1
    D. 12:1
    E. 120:1

C

3. Why do we use AC power in our homes, not DC?
    A. To minimize loss in power lines: need high voltage
    B. Only changing magnetic fields induce current in coils
    C. Changing the current in a coil produces a changing magnetic field
    D. Transformers to change voltage only work for AC
    E. All of the above

E

4. How much current will your 1200 W blow-dryer demand in a house powered by 120 V AC?
   A. 0.1 Amps
   B. 1 Amp
   C. 10 Amps
   D. 100 Amps
   E. Question doesn’t make sense for alternating current

Ↄ