Republic Polytechnic

**A107 Physics**

**Problem Review Part 2 (P5-P6) – Practice Questions**

1. A man is pushing a box with a force of 500 N and the box moves 2 m. What is the work done on the box?
2. Figure 13 shows that an object of 11 kg is brought up to a height of 3 m.

11 kg

3 m

Figure 13

By taking *g* = 10 m/s2,

1. What is the work done in bringing an object upwards by 3 m?
2. What is the gain in gravitational potential energy (GPE) of the object?
3. A ball is dropped from a height of 5 m as shown in Figure 14.

2 kg

5 m

Ground

Figure 14

Assuming there is no air resistance and taking *g* = 10 m/s2, what is the velocity of the ball just before it hits the ground?

1. Figure 15 shows an object of 30 kg moving at a constant speed of 1.5 m/s.

30 kg

1.5 m/s

Motor

Figure 15

Determine the power of the motor.

1. Figure 16 shows a continuous column of water flowing in the tube in the direction indicated with no leakage.

Segment P

Segment Q

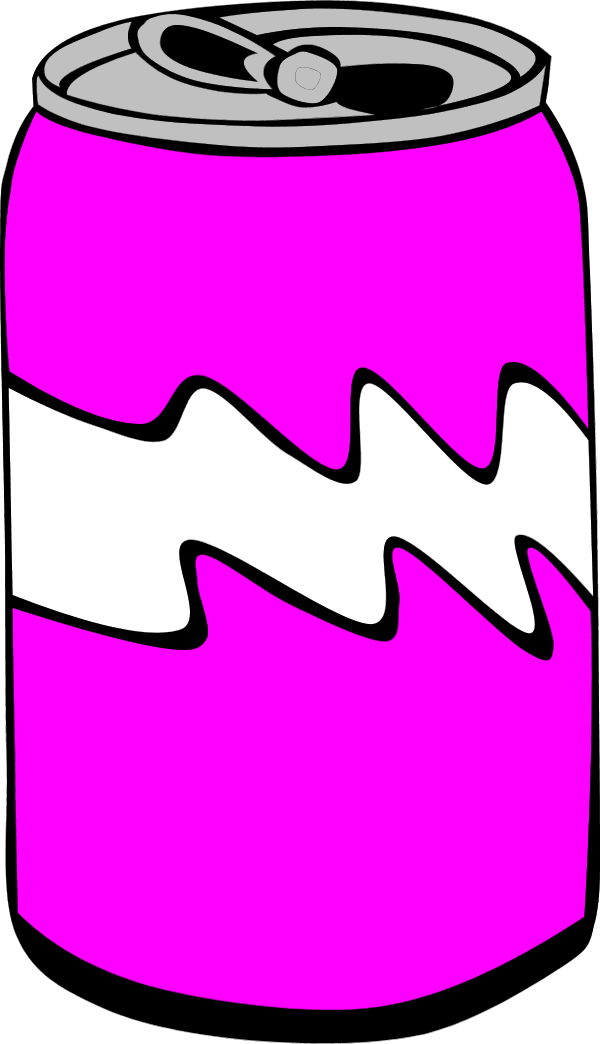
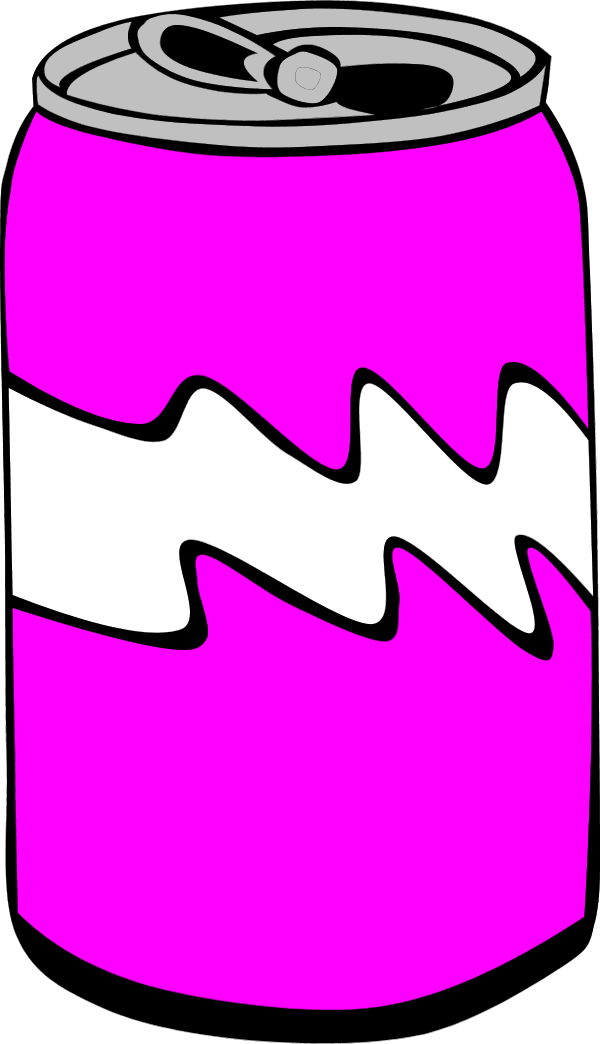
Segment R

Water flow

Figure 16

Arrange the speed of water flow in segments P, Q and R in ascending order (i.e. from the smallest to the largest).

1. There is a continuous column of air blowing in between the two cans as depicted in Figure 17.

A

B

A

Figure 17

Assume the cans are filled with some liquid,

1. Which region (A or B) would the speed of the streamline flow be faster? Explain your answer.
2. Explain what will happen to the two cans.

**<< THE END >>**

1. A liquid enters a non-uniform tube with speed of 0.5 m/s as shown in Figure 18. The tube has a starting cross-sectional area of 5 cm2 and ending cross-sectional area of 2.5 cm2. The liquid pressure at the start of the tube is 2000 Pa and the tube is lying horizontally on the ground.

*v*1= 0.5 m/s  
*A*1 =5 cm2  
*P*1 = 2000 Pa

*v*2 = ?   
*A*2 =2.5 cm2  
*P*2 = ?

*v*2

Figure 18

If the density of the liquid is 1000 kg/m3 and assuming no leakage,

1. What is the flow speed of the liquid out of the tube?
2. What is the liquid pressure at the end of the tube?
3. A section of a non-uniform tube placed horizontally is completely filled with water as shown in Figure 19. The speed of water at segment 1 and segment 2 are *v*1 and *v*2, respectively.

*v*1 = 5 m/s

*v*2

Segment 1

Segment 2

Figure 19

It is known that the cross-sectional area of segment 1 is two times the cross-sectional area of segment 2. Determine the speed (*v*2) of the water in segment 2 assuming there is no leakage.

1. Figure 20 shows water flowing through a tube. The tube consists of two segments with different cross-sectional areas and the segments are positioned at different heights from the ground as depicted in Figure 20.

Segment 1

Segment 2

*h*1

*h*2

*A*1

*A*2

*v*1

*v*2

Ground

*P*1

*P*2

Figure 20

It is known that the density of water is 1000 kg/m3 and *g* = 10 m/s2.

1. Given that the *v*1 = 3 m/s and *v*2 = 9 m/s, determine the ratio of *A*1/*A*2.
2. Given that the *h*1 = 5 m, *h*2 = 1 m and *P*1 = 5000 Pa, determine the pressure *P*2.

**<< THE END >>**