

This print-out should have 7 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

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**Force Function**

**001** 10.0 points

A 3.3 kg block moving along the  $x$  axis is acted upon by a single horizontal force that varies with the block's position according to the equation

$$F_x = ax^2 + b,$$

where  $a = 5 \text{ N/m}^2$ , and  $b = -3.4 \text{ N}$ . At 1.4 m, the block is moving to the right with a speed of 4.4 m/s.

Determine the speed of the block at 2.2 m.

Correct answer: 5.06906 m/s.

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**Serway CP 05 52**

**002** (part 1 of 3) 10.0 points

A 1320 kg car accelerates uniformly from rest to 19 m/s in 4.75 s.

Find the work done on the car in this time interval.

Correct answer: 238.26 kJ.

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**003** (part 2 of 3) 10.0 points

Find the average power delivered by the engine in this time interval.

Correct answer: 67.2386 hp.

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**004** (part 3 of 3) 10.0 points

Find the instantaneous power delivered by the engine at  $t = 1.82 \text{ s}$ .

Correct answer: 51.526 hp.

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**Pulling a Crate**

**005** (part 1 of 2) 10.0 points

A 191 kg crate is pulled along a level surface by an engine. The coefficient of kinetic friction between the crate and the surface is 0.619.

The acceleration of gravity is  $9.8 \text{ m/s}^2$ .

How much power must the engine deliver

to move the crate at a constant speed of 5.61 m/s?

Correct answer: 6499.99 w.

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**006** (part 2 of 2) 10.0 points

How much work is done by the engine in 2.15 min?

Correct answer:  $8.38499 \times 10^5 \text{ J}$ .

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**Power of Nature**

**007** 10.0 points

A rain cloud contains  $2.16 \times 10^7 \text{ kg}$  of water vapor.

The acceleration of gravity is  $9.8 \text{ m/s}^2$ .

How long would it take for a 4.5 kW pump to lift the same amount of water to an altitude of 23000 m?

Correct answer: 34.3075 years.