AP Physics C

The Exams

Two Separate Exams:

- Mechanics
- Electricity & Magnetism

Each Exam:

- 35 multiple-choice questions (45 minutes)
  pencil only, table of information provided
- 3 free-response questions (45 minutes)
  calculator, table of equations

Total time: 3 hours

Mechanics: (50%)

- Kinematics (10%)
- Newton's Laws of motion including centripetal force and friction (7%)
- Work, energy and power (6%)
- Systems of particles and linear momentum (9%)
- Circular motion and rotation (9%)
- Oscillations and gravitation (9%)

Electricity and Magnetism: (50%)

- Electrostatics (15%)
- Conductors, capacitors and dielectrics (7%)
- Electric circuits (10%)
- Magnetic fields (10%)
- Electromagnetism (8%)

Types of questions

- Conceptual questions
- Numerical calculation questions
- Algebraic calculation questions
- Graphical analysis questions

Multiple Choice

- Physical situation problems
- Lab questions

Free Response

Conceptual

Two teams engage in a tug-of-war with a rope held horizontally. Which is true of the winning team?

A. They were stronger.

B. They had more mass.

C. They exerted a greater tension force through the rope.

D. They exerted a greater force on the ground parallel to the surface.

E. They exerted a greater force on the ground perpendicular to the surface.

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Numerical Calculation

A 5 kg mass is sliding across a horizontal surface at constant speed while being pulled by a rope with a tension of 30 N held at 30° above the horizontal. The force exerted by friction is most nearly

A. $25\sqrt{3}$ N

B. $15\sqrt{3}$ N

C. 25 N

D. 15 N

E. 20 N

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Algebraic Calculation

A mass *m* is accelerated from rest across a smooth horizontal surface by a rope held parallel to the surface. The tension *F* in the rope is constant. After time *t*, the instantaneous power delivered to the mass by the rope is

A. $(F/m)t$

B. $(F^2/m)t$

C. $(F/m)t^2$

D. $(F^2/m)t^2$

E. (F^2/m)

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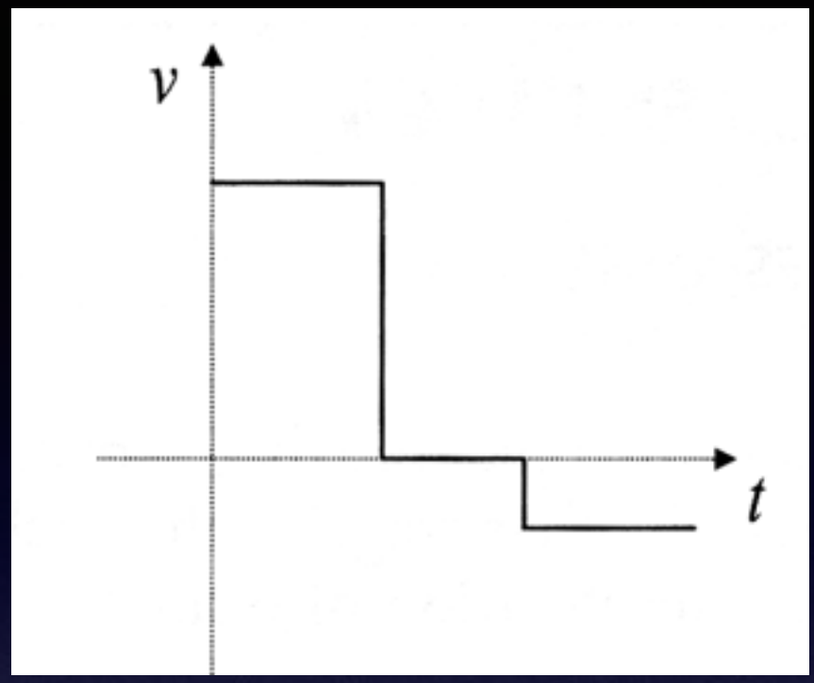
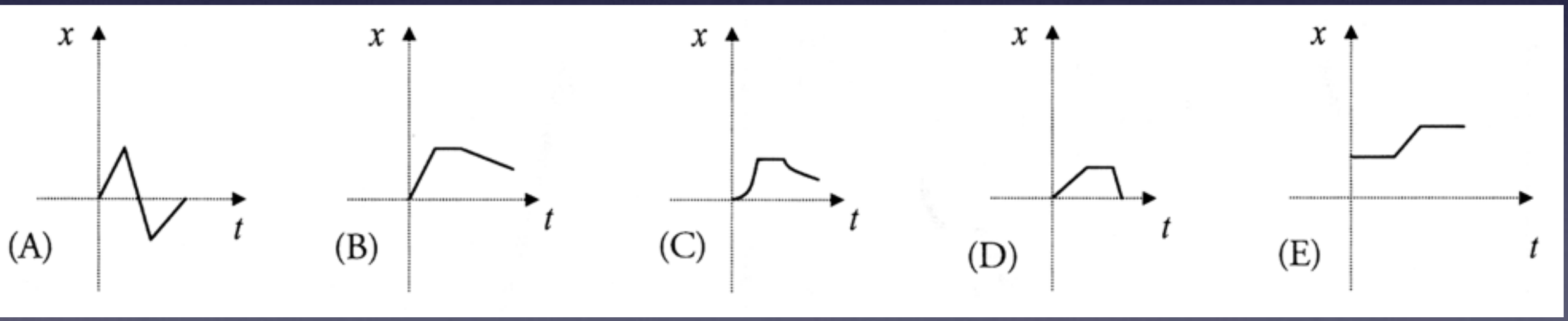
Graphical Question

An object moves with a velocity vs. time graph as shown to the right.
The position vs. time graph for the same time period would be





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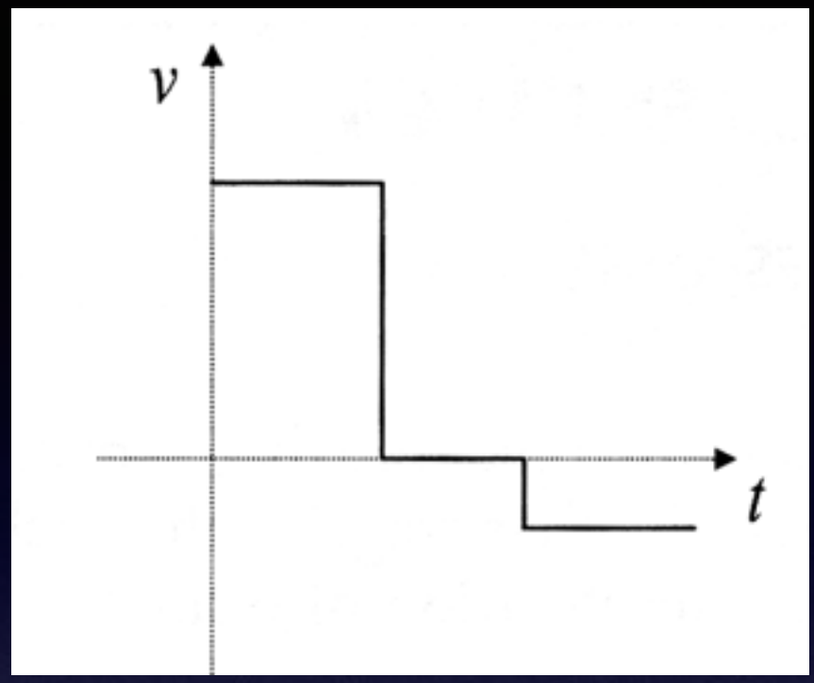
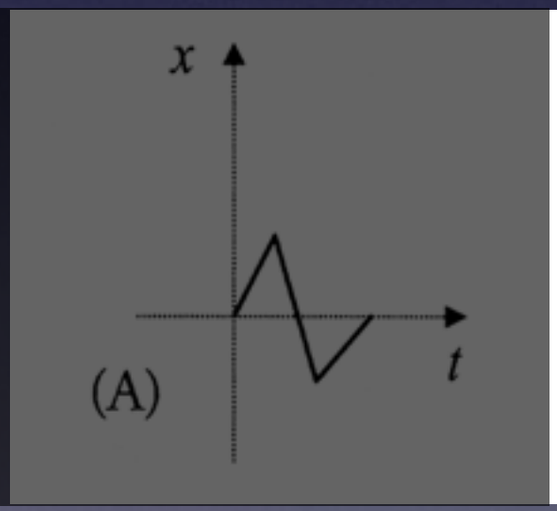
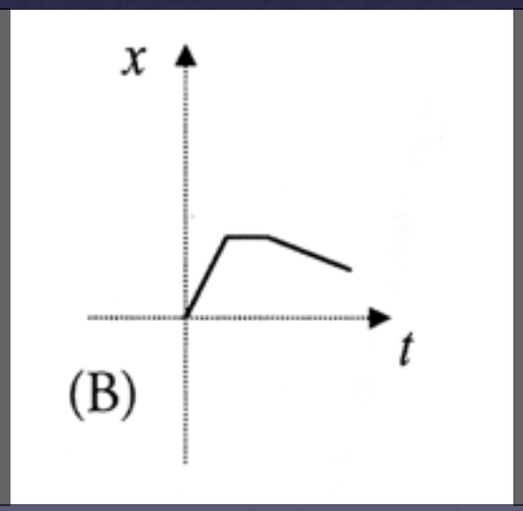
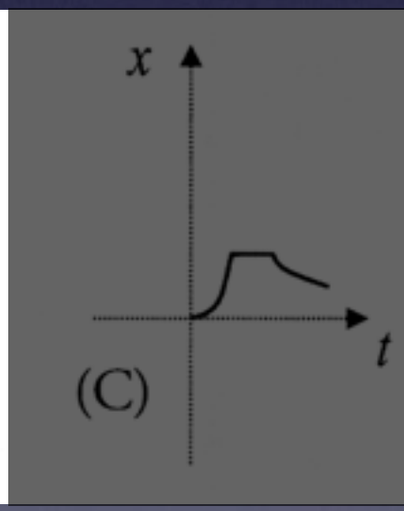
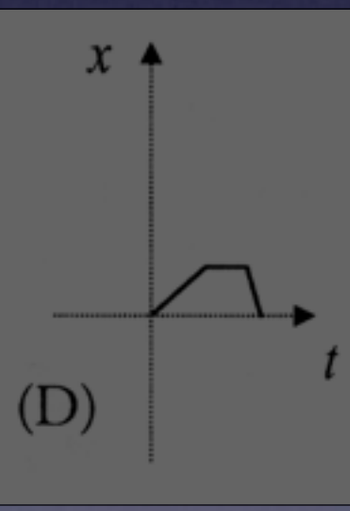
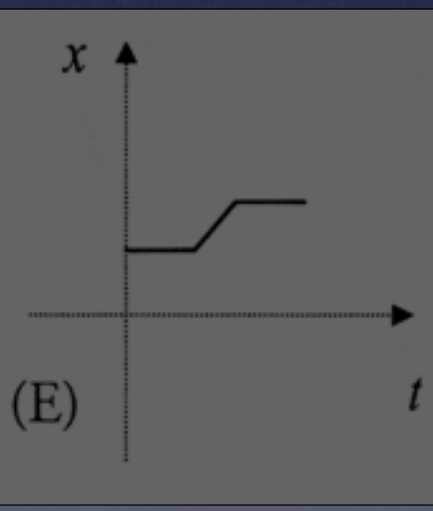






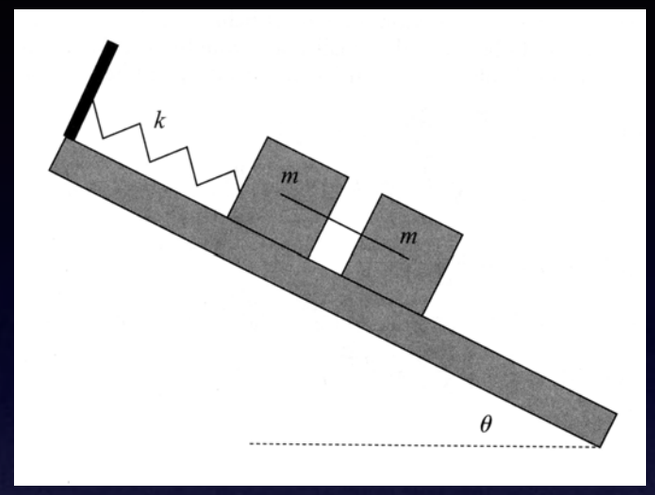






Physical Situation Problems

Two equal masses *m* connected by a light string are currently at rest on a frictionless surface inclined at an angle θ. One of the masses is connected by a spring with constant *k* to a point at the top of the incline. At *t* = 0, the string is cut, and the mass connected to the spring begins to oscillate.



1. Determine the period and amplitude of the oscillations.
2. In terms of the given quantities, write an expression for the velocity of the oscillating mass at some time t.

Lab Questions

You should be able to

1. Devise an experiment to measure a basic property.
2. Explain in words and equations how an experiment achieves the desired result.
3. Analyze an experiment for sources of error.
4. Report data to an appropriate level of precision (sig figs).