PHYS11/12: Final Exam Strategy

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Learning Objectives

By the end of this presentation, you will be able to:

- Understand the proficiency scale used for grading open-ended questions
- Apply strategic time management techniques during the exam
- Use the G.U.E.S.S. method systematically for problem-solving
- Distinguish between Proficient and Extending level responses
- Demonstrate clear, logical thinking in your solutions

Understanding the Proficiency Scale

Four Levels of Understanding

- **Emerging:** Limited understanding, incomplete solutions
- **Developing:** Partial understanding, some correct elements
- **Proficient:** Clear understanding, systematic approach
- **Extending:** Deep understanding, sophisticated reasoning

Key Point: *How* you solve a problem is as important as your final answer!

The First Five Minutes: Strategic Setup

1. **Brain Dump (30 seconds):** Write essential formulas, constants, and rules on scrap paper
2. **Survey the Battlefield (2 minutes):** Scan the entire exam, identify open-response questions
3. **Internalize the Goal:** Remember to be clear, systematic, and logical

Pro Tip

Get worried formulas out of your head and onto paper immediately!

The Three-Pass Strategy

Don't do the exam in order! Maximize your points.

Pass 1: Quick Wins (10-15 min)

Answer all easy multiple-choice questions you know instantly. Circle harder questions and move on.

Pass 2: The Deep Dive (45-50 min)

Focus on open-response questions using the G.U.E.S.S. method. Spend quality time here.

Pass 3: The Finish Line (10-15 min)

Attempt remaining questions, review work, transfer answers carefully.

Introducing the G.U.E.S.S. Method

Your roadmap to **Proficient** level responses:

G - Givens & Diagram
U - Unknowns & Plan
E - Equations
S - Substitute & Solve
S - Solution & Statement

Remember: This systematic approach demonstrates your thinking process!

G - Givens & Diagram

What to Include

- List all knowns and unknowns clearly
- Example: $V = 16\,\text{V}$, $I_{\text{off}} = 0.40\,\text{A}$, $I_{\text{on}} = 0.90\,\text{A}$, $P_{\text{screen}} = ?$
- Make a clear, labeled diagram

Diagram Types

- **Circuits:** Redraw the circuit clearly
- **Forces:** Draw free-body diagrams
- **Kinematics:** Sketch the motion path

Key: This directly addresses the "Proficient" criterion for clear organization.

U - Unknowns & Plan

State Your Strategy

- Clearly state what you need to find
- Explain how you will solve it

Example Planning Statement

"To find the power of the screen, I will first find the current used by the screen alone. Then I will use the power formula $P = IV$."

Impact: This single sentence elevates your response from "Developing" to "Proficient" by showing logical planning!

E - Equations

Best Practices

- Write base formulas *before* plugging in numbers
- Show the physics principles you're using
- Examples: $P = IV$, $V = IR$, $F_{\text{net}} = ma$

Why This Matters

Demonstrates you understand the relevant physics concepts, not just arithmetic.

S - Substitute & Solve

Show Logical Steps

- Work line-by-line, vertically down the page
- Use units consistently in every step
- Don't show scattered calculations

Good Example:

$$I_{\text{screen}} = I_{\text{on}} - I_{\text{off}} \quad (1)$$
$$= 0.90\,\text{A} - 0.40\,\text{A} \quad (2)$$
$$= 0.50\,\text{A} \quad (3)$$

Bad Example:

$$0.9 - 0.4 = 0.5 \quad (4)$$

Units are a major differentiator between "Developing" and "Proficient"!

S - Solution & Statement

Final Presentation

- **Box your final answer**
- Write a concluding statement with units
- Example: "Therefore, the power used by the screen alone is 8.0 W."

Complete Solution Format

$$\boxed{P_{\text{screen}} = 8.0\,\text{W}}$$

"Therefore, the power used by the screen alone is 8.0 W."

Reaching the 'Extending' Level

Extending = Sophisticated understanding and complete command of physics

Three Key Strategies

1. **Find Hidden Details:** State implied information explicitly
2. **Explain the Physics:** Don't just show math, explain why
3. **Check Your Answer:** Sense-check, units, alternative methods

Hidden Details Examples

- "starts from rest" $\rightarrow v_i = 0$
- "on the moon" $\rightarrow$ use g_{moon}
- "no atmosphere" $\rightarrow$ no air resistance

Proficient vs. Exemplary: Capacitor Circuit

Question: For a given circuit, what is the voltage across and current through the capacitor a long time after the switch is closed?

Proficient Answer

After a long time, the capacitor is fully charged.
$I_C = 0$ A $V_C = 12$ V

Extending Answer

After a long time, the capacitor is fully charged and acts like an **open circuit**.

- **Current (I_C):** Because the circuit is open, no current can flow. Therefore, $\mathbf{I_C = 0\ A}$.
- **Voltage (V_C):** With zero current, there is no voltage drop across the resistor ($V_R = I \cdot R = 0$). All of the battery's voltage must be across the capacitor. Therefore, $\mathbf{V_C = 12\ V}$.

I Do: Complete G.U.E.S.S. Example

Problem: A laptop uses 0.40 A when off and 0.90 A when on. If the voltage is 16 V, what power does the screen use?

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E - Equations: $I_{\text{screen}} = I_{\text{on}} - I_{\text{off}}$, $P = IV$
S - Solve: $I_{\text{screen}} = 0.90\,\text{A} - 0.40\,\text{A} = 0.50\,\text{A}$ $P = (16\,\text{V})(0.50\,\text{A}) = 8.0\,\text{W}$

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E - Equations: $I_{\text{screen}} = I_{\text{on}} - I_{\text{off}}$, $P = IV$
S - Solve: $I_{\text{screen}} = 0.90\,\text{A} - 0.40\,\text{A} = 0.50\,\text{A}$ $P = (16\,\text{V})(0.50\,\text{A}) = 8.0\,\text{W}$
S - Statement: $\boxed{\therefore P_{\text{screen}} = 8.0\,\text{W}}$

Summary: Your Path to Success

Remember the Strategy

- **First 5 minutes:** Brain dump, survey, internalize goals
- **Three-pass approach:** Quick wins $\rightarrow$ Deep dive $\rightarrow$ Finish line
- **G.U.E.S.S. method:** Your systematic problem-solving framework

Proficient $\rightarrow$ Extending

- Find hidden details and state assumptions
- Explain the physics, not just the math
- Always check your answers multiple ways

Final Reminder: Show your thinking process clearly – that's what the rubric measures!

Final Words of Encouragement

Stay Calm

Be Systematic

Show What You Know