PLANIT TEACHERS — Total Internal Reflection: Physics Practice Worksheet

Name: _____   Date: _____   Class: _____

SECTION A: MULTIPLE CHOICE QUESTIONS (10 points)

1. Total internal reflection occurs when:

    a. Light passes through a medium unchanged

    b. Light is completely reflected within a denser medium at an angle greater than the critical angle

    c. Light is always refracted

    d. Light is partially absorbed

2. The critical angle depends on:

    a. The color of light

    b. The refractive indices of two media

    c. The temperature of the medium

    d. The shape of the light source

SECTION B: CALCULATION PROBLEMS (20 points)

3. Calculate the critical angle between glass (n = 1.5) and air (n = 1.0):

Show your complete work here:

Final Answer: _____ degrees

4. A light ray travels from water (n = 1.33) to glass (n = 1.5). Determine:

   a. The critical angle
   b. What happens to the light ray at this angle

Calculation and explanation:

Answers: a) Critical Angle: _____ b) Light Behavior: _____

SECTION C: PRACTICAL APPLICATION (30 points)

5. Explain how total internal reflection is used in:

   a. Fiber optic communication
   b. Medical endoscopy
   c. Prisms in binoculars

SECTION D: DIAGRAM ANALYSIS (20 points)

6. Draw and label a diagram showing:

- Incident ray
- Refracted ray
- Critical angle
- Normal line
- Boundary between two media

SECTION E: CRITICAL THINKING (20 points)

7. Describe how total internal reflection differs from regular refraction:

8. Propose an original experiment to demonstrate total internal reflection:

Materials needed: Procedure: Expected observations:

BONUS CHALLENGE (10 extra points)

9. Research and explain how some animals use total internal reflection in nature:

SCORING BREAKDOWN

Section A (Multiple Choice): ___/10

Section B (Calculations): ___/20

Section C (Practical Applications): ___/30

Section D (Diagram Analysis): ___/20

Section E (Critical Thinking): ___/20

Bonus Challenge: ___/10

TOTAL SCORE: ___/100

SUBMISSION GUIDELINES

- Use clear, legible handwriting
- Show all work for calculation problems
- Provide complete, thoughtful explanations
- Check your work before submission