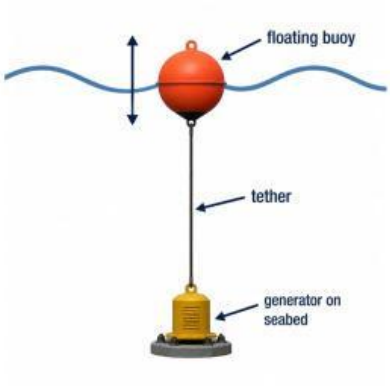
Name:_____ Date:_____

Wave Energy Conversion Practice

Mechanism 1: Point Absorber Buoy



1. Identify the primary type of energy present in the moving ocean waves.

a) Chemical energy

b) Kinetic energy

c) Nuclear energy

d) Sound energy

2. How would an increase in wave **amplitude** (taller waves) affect the vertical movement and the amount of energy captured by this buoy?

a) The buoy moves less and captures less energy.

b) The buoy moves farther and captures more energy.

c) The buoy stops moving because the waves are taller.

d) The amplitude changes the wave frequency only.

3. Describe the final energy conversion taking place inside the generator as the buoy bobs up and down.

a) Electrical energy into thermal energy

b) Electrical energy into chemical energy

c) Sound energy into light energy

d) Mechanical energy into electrical energy

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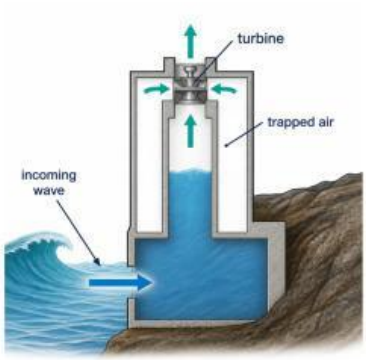
Mechanism 2: Oscillating Water Column



4. As the wave enters the chamber, it forces air up through the turbine. Describe how the kinetic energy transfers in this step.

a) Water's kinetic energy transfers to air, then to the turbine.

b) Air's chemical energy transfers directly to the turbine.

c) The turbine transfers electrical energy to the water.

d) Water's thermal energy transfers to the generator.

5. If the wave **frequency** increases (more waves arriving per minute), how will this change affect the rotation of the turbine?

a) It will spin less often.

b) It will stop completely.

c) It will be pushed more often and may spin faster.

d) Its rotation will become unrelated to the waves.

6. Complete the overall energy conversion path for this device:

a) Mechanical wave energy → kinetic energy of air → electrical energy

b) Mechanical wave energy → chemical energy of air → electrical energy

c) Electrical energy → kinetic energy of water → sound energy

d) Thermal energy → mechanical wave energy → nuclear energy

Mechanism 3: Surface Attenuator

7. The device flexes at the hinges as waves pass under it. Explain why it is important for engineers to match the segment lengths to the typical **wavelength** of the local ocean waves.

a) Matching wavelengths helps the device bend at its hinges and capture motion.

b) Matching wavelengths prevents the waves from moving the device.

c) Segment length controls the wave's frequency.

d) Segment length changes ocean water into electrical energy.

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8. The flexing motion drives hydraulic pumps inside the hinges. What is the final form of energy that this device must convert the mechanical motion into before sending it back to shore?

a) Chemical energy

b) Gravitational energy

c) Nuclear energy

d) Electrical energy

9. If wave speed increases while wavelength stays the same, what happens to wave frequency?

a) It decreases.

b) It increases.

c) It stays exactly zero.

d) It changes into amplitude.

10. Which energy conversion best describes the surface attenuator shown in the picture?

a) Wave mechanical energy → hydraulic energy → electrical energy

b) Chemical energy → wave mechanical energy → electrical energy

c) Electrical energy → hydraulic energy → wave mechanical energy

d) Thermal energy → nuclear energy → electrical energy

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