Teacher Answer Key

Case Study

1. The dark pavement absorbed solar energy, warming the surface enough to bring snow and ice to the melting point, so they turned into liquid water even though the surrounding air was still close to freezing.

2. Overnight, the air and pavement cooled below 0 °C. The liquid water lost energy to the colder surroundings and released latent heat as it froze into a thin layer of ice, which was hard to see but very slippery.

Multiple Choice

1. A

2. B

3. D

Matching

1-B, 2-D, 3-E, 4-C, 5-A

Fill-in-the-Blank

1) heat, 2) sublimation, 3) point

Short Answer (Sample Responses)

Q1: Sunlight warms dark surfaces like pavement and roofs, causing localized melting and puddles. When temperatures drop after sunset, that water loses energy and refreezes as ice, especially in shaded or low spots, creating slippery conditions by morning.

Q2: When snow melts, it absorbs latent heat from the environment to break the crystal structure without changing temperature much. When that meltwater later refreezes, it releases latent heat back to the surroundings as liquid water locks into a solid crystal pattern again.

Q3: Dry, powdery snow forms at colder temperatures, so the ice crystals stay solid and don't have much liquid water between them, making it hard for flakes to stick together. Wet, sticky snow forms near the freezing point, where a thin layer of liquid water coats the crystals, allowing them to pack and refreeze into a solid snowball.