

For all the following multiple-choice questions, circle your answers clearly. No partial credit will be awarded; any scratch work will be ignored.

1. Which of the following is a physical principle used in class to derive the heat equation?

- (a) Conservation of momentum
- (b) Principle of least action
- (c) Conservation of (heat) energy
- (d) Second law of thermodynamics
- (e) Maxwell's equations

2. What trait makes an equation a Partial Differential Equation (PDE)?

- (a) The equation involves partial derivatives
- (b) The equation is derived from physical principles
- (c) The equation is derived from the law of partial differentials
- (d) There is a unique solution to the equation
- (e) There are many solutions to the equation

3. We usually need to supplement PDE's with boundary conditions because boundary conditions

- (a) describe physics of the problem at spatial boundaries
- (b) are an alternative model to the PDE
- (c) make finding solutions to the PDE easier
- (d) are used to derive more PDE's
- (e) always make solutions to PDE's unique