TABLE PT8.2 Specific study objectives for Part Eight.

1. Recognize the difference between elliptic, parabolic, and hyperbolic PDEs.
2. Understand the fundamental difference between finite-difference and finite-element approaches.
3. Recognize that the Liebmann method is equivalent to the Gauss-Seidel approach for solving simultaneous linear algebraic equations.
4. Know how to determine secondary variables for two-dimensional field problems.
5. Recognize the distinction between Dirichlet and derivative boundary conditions.
6. Understand how to use weighting factors to incorporate irregular boundaries into a finite-difference scheme for PDEs.
7. Understand how to implement the control-volume approach for implementing numerical solutions of PDEs.
8. Know the difference between convergence and stability of parabolic PDEs.
9. Understand the difference between explicit and implicit schemes for solving parabolic PDEs.
10. Recognize how the stability criteria for explicit methods detract from their utility for solving parabolic PDEs.
11. Know how to interpret computational molecules.
12. Recognize how the ADI approach achieves high efficiency in solving parabolic equations in two spatial dimensions.
13. Understand the difference between the direct method and the method of weighted residuals for deriving element equations.
14. Know how to implement Galerkin's method.
15. Understand the benefits of integration by parts during the derivation of element equations; in particular, recognize the implications of lowering the highest derivative from a second to a first derivative.