EASTERN NAZARENE COLLEGE

PY 312 Applied Mechanics

Spring 2007

Study Guide Exam #1

Classical Mechanics, A. Douglas Davis, Chapters 1, 2, 3, and 4

You should be able to:

1. State and explain Newton's Three Laws
2. State the relationship between force and potential energy and the relationship between potential energy and force
3. Know how to solve Newton's second law relationship when the force is a function of time, space, and velocity
4. classify second order differential equations
5. Describe the motion of a particle moving in a potential (like Fig. 2.5.1) along with the forbidden regions, turning points, and allowed regions
6. State the solution to the simple harmonic oscillator and the damped harmonic oscillator
7. state and explain the three cases for a damped harmonic oscillator
8. state and describe the solution to the driven damped harmonic oscillator (mainly Eqns.3.5.6, 13, and 16)
9. draw and explain the resonance curve (Fig. 3.5.1) for a driven damped harmonic oscillator along with the resonance frequency (Eqn. 3.5.18) and maximum amplitude (Eqn. 3.5.19)
10. start with the pendulum equation and show that for small angles it behaves like a simple harmonic oscillator
11. take the derivative of a vector function in Cartesians coordinates
12. take the gradient of a function in Cartesians coordinates
13. take the divergence of a vector function in Cartesians coordinates
14. take the curl of a vector function in Cartesians coordinates
15. take the line integral of a vector function
16. state and use the divergence or Gausses theorem (Eqn. 4.6.21)
17. state and use Stokes or Greens theorem (Eqn. 4.6.31)