

Study Guide Exam #3

Classical Mechanics, A. Douglas Davis, Chapters 8 and 9

You should be able to:

1. define: velocity (8.1.5), acceleration (8.1.7), and momentum (8.2.6) for a system of particles.
2. state and explain Newton's Second Law for system of particles (8.1.11) and (8.2.10) but better

$$\vec{F}_{net} = M\vec{A} \quad \vec{F}_{net} = \frac{d\vec{P}}{dt}$$

3. define center of mass for point particles (8.1.30) and a rigid body (9.1.3)
4. state the relationship for angular momentum for a system of particles (9.5.12)
5. show when equation (9.5.12) reduces to (9.2.7)
6. state the relationship for kinetic energy for a system of particles (9.7.6) and (9.7.7)
7. state and explain the parallel-axis theorem (9.4.6)
8. state and explain the perpendicular-axis theorem (9.4.11)
9. define the inertia tensor for a system of point particles (9.5.11) and a rigid body (9.5.13)
10. diagonalize the moment of inertia tensor
11. state Newton's Second Law in angular form (9.8.2) but better

$$\vec{\tau}_{net} = \frac{d\vec{L}}{dt}$$

12. calculate the center of mass
13. work a variable mass problem
14. work a collision problem
15. work a rotation about a fixed axis problem
16. calculate the moment of inertia Ex. 9.6.1
17. work a general rotational problem