Physics 1AH – Prof. J. Rosenzweig – Fall 2019

Midterm 1 – Practice Problems

October 17, 2019

Covering Chapters 1-3, Kleppner and Kolenkow

In addition to your homework problems, some suggested problems from the text for study:

1. Exercise 1.2 Vector algebra 2. What is the value of cos(θ) between A and B?

2. Exercise 1.4 Direction cosines. The algebraic method is quite straightforward.

3. Exercise 1.9 Perpendicular unit vector. The curl comes in handy.

4. Exercise 1.12 Constructing a vector to a point. The vector r_1-r_2 must be rescaled andadded to r1.

5. Exercise 1.19 Relative velocity. A straightforward exercise in coordinate systems.

6. Exercise 2.2 Two blocks and string. What is the tension in the string?

7. Exercise 2.5 Concrete mixer. This is a pretty fast mixer…

8. Exercise 2.10 Three masses. Testing your diagramming capabilities.

9. Exercise 2.15 Disk with catch. This exercise is a good concept check.

10. Exercise 3.2 Sliding blocks with friction. Determining coefficient of static friction.

11. Exercise 3.7 Pulleys and rope with friction. Diagraming the forces, including friction.

12. Exercise 3.9 Tension in a rope. Follow Example 3.2.

13. Exercise 3.16 Off-center tunnel. This result, discussed in class, is easily seen by resolving the component of the gravitational force along the direction of the tunnel.

14. Exercise 3.22 Mass, string, and ring. This will make more sense when we study angular momentum.