

### Exam 3 (December 6, 2001)

Please read the problems carefully and answer them in the space provided. Write on the back of the page, if necessary. Show all your work. Partial credit will be given.

#### Problem 1 (10 pts):

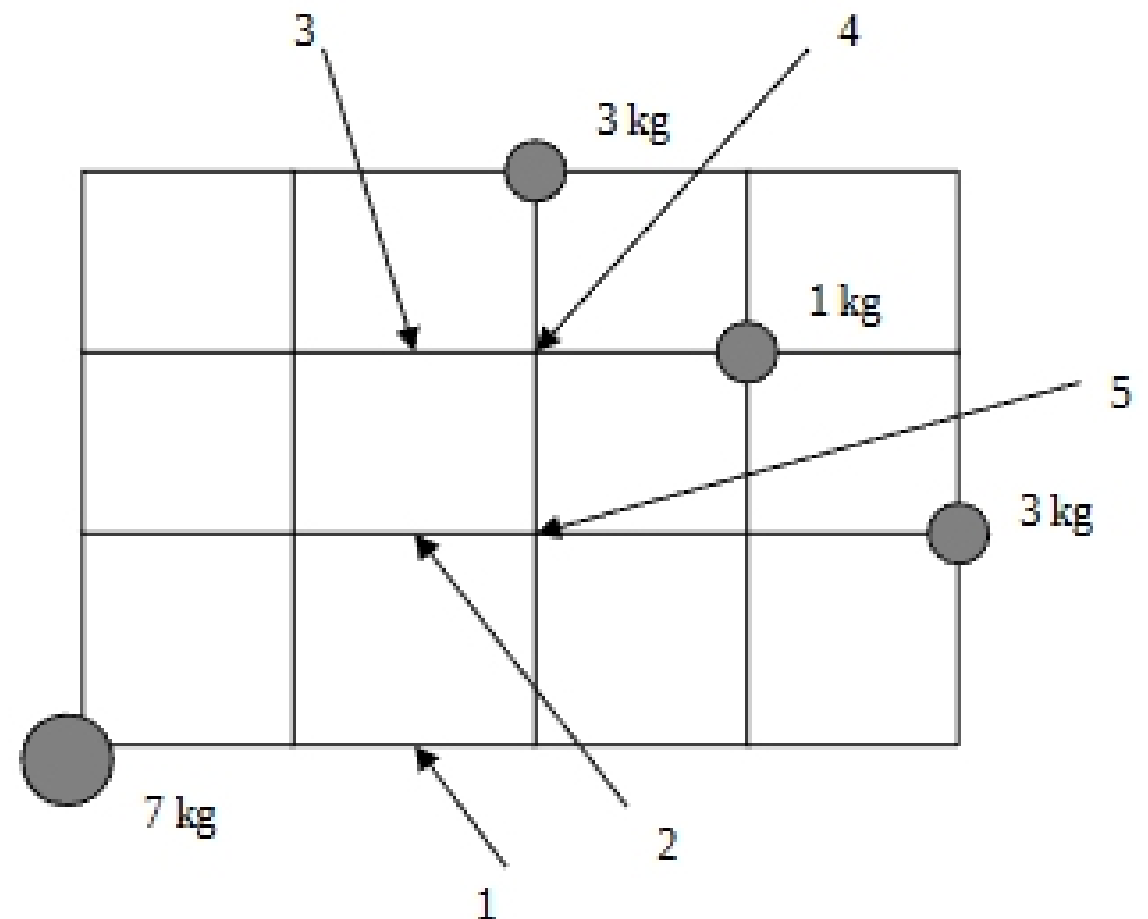
You are riding a bicycle up a hill. Your speed is decreasing.

- a) From your point of view, what is the direction of the angular velocity vector of the front wheel of the bicycle? (Your choices are up, down, toward the right, toward the left, toward the front or toward the back.)
  
- b) From your point of view, what is the direction of the angular acceleration vector of the front wheel of the bicycle? (choices are the same as in part (a))
  
- c) From you point of view, what is the direction of the angular momentum vector of the front wheel of the bicycle? (choices are the same as in part (a))

#### Problem 2 (15 pts):

Circle the correct answer. Show your work. The center of mass of the system of particles shown in the diagram is at point

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5



**Problem 3 (15 pts):**

A plastic sphere floats in water with 50.0% of its volume submerged. This same sphere floats in glycerin with 40.0% of its volume submerged. Determine the densities of the glycerin and the plastic in the sphere.

1)	/10
2)	/15
3)	/15
4)	/15
5)	/15
6)	/15
7)	/15
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tot	/100

**Problem 4 (15 pts):**

An 1810 kg truck traveling eastward at 64.4 km/h collides at an intersection with a 905 kg automobile traveling northward at 96.5 km/h. The vehicles lock together and immediately after the collision are headed in which direction?