

EXAM 3

Name: _____

Student ID #: _____

TA (circle one): Cook Costello Flitcroft Johnson Young

(34PTS / 101)

A. [18 pts.] Two objects, A and B, are hurled vertically upward from the same starting location with the same KE. The mass of A is twice the mass of B. In the spaces provided enter A, B, same, or neither that best satisfies the statement. Take the starting location to be the reference position for gravitational PE for both objects.

3PTS EACH

1. B The object with the greater initial speed
2. SAMB The object with the larger GPE at the highest position reached for that object
3. B The object that travels the larger vertical distance
4. SAMB The object with the larger mechanical energy at the starting location
5. A The object with the larger initial momentum (double star)
6. NEITHER The object conserving momentum during the entire trip

B. [6 pts.] Front air bags in automobiles are used to reduce the severity or eliminate entirely injuries to passengers in front end collisions. Explain carefully, using the physics principles you learned about during the past weeks, how air bags work.

IN AN CRASH $\vec{F}_{AV} \Delta t = \vec{I} = \Delta \vec{p}$. $\Delta \vec{p}$ WILL BE DETERMINED BY m OF PASSENGER AND \vec{v} UPON IMPACT. HOWEVER, \vec{F}_{AV} , THE INJURY CAUSING AGENT CAN BE REDUCED BY INCREASING Δt . AIR BAGS INCREASE Δt , THEREBY REDUCING \vec{F}_{AV}

{CRUCIAL PART IS LAST SENTENCE}

C. [10 pts.] A disk (as shown) starting from rest rotates about a fixed axis with a constant angular acceleration. Three points, A, B and C are on the disk and rotate with the disk. In the spaces below enter A, B, C, or same to best fit the statement. Note: $r_A < r_B < r_C$.

2PTS EACH

1. SAMB The point(s) with the smallest angular speed
2. C The point(s) with the largest tangential speed
3. SAMB The point(s) with the smallest angular acceleration
4. A The point(s) with the smallest tangential acceleration
5. A The point(s) with the smallest centripetal acceleration

