Show ALL your work. Writing just the answer receives NO credit.

Energy and Momentum in class assignment

1) A roller coaster car (375kg) moves from A (5.00m above the ground) to B (20.0m above the ground). Two nonconservative forces are present: friction does 2.00×10^4 J of work on the car, and a chain mechanism does 3.00×10^4J of work to help the car up a long climb. What is the change in the car's kinetic energy, $\Delta E_k = E_{kf} - E_{ki}$, from A to B? (3 marks)

2) A 2200kg bus was traveling 13m/s North then turned a corner in 1.4s to traveling East at 11m/s. What is the impulse that the ground exerted on this bus? (4 marks)

3) A 170g cue ball moving at 1.3m/s South towards another 160g stationary cue ball. After the collision, the 170g cue ball is moving at 0.91m/s at 35° West of South.

a) What is the velocity of the 160g cue ball after the collision? (3 marks)

b) Is this an elastic or inelastic collision? Show work to prove this. (2 mark)

4) A poor 6.0kg frozen cantaloupe was accidentally dropped on the ground and exploded into 3 pieces. A 2.1kg piece flew North at 0.24m/s. Another 2.7kg piece flew 71° South of East at 0.18m/s. What is the velocity of the 3rd piece after the explosion? (4 marks)