**You must JUSTIFY the answers you indicate for each problem. You may show your mathematical work, provide a clear definition, eliminate incorrect answers, etc. Only partial credit will be given if a clear justification is not provided.**

**Multiple Choice (Worth up to 10 points):** Given: Two masses (M1 and M2) are a system. Let \( E = KE + PE \) be the total energy of the system and \( p \) be the total momentum of this system. Mass M1 slides on a frictionless horizontal surface and collides and sticks to a mass M2, initially at rest, that is at the bottom of a frictionless ramp.

a) What is conserved in the collision?

1. E is conserved in the collision.
2. \( p \) is conserved in the collision.
3. Both E and \( p \) are conserved in the collision.
4. Neither E nor \( p \) is conserved in the collision.

b) After the collision, masses M1 and M2 slide together up the curved ramp and come to a rest. What is conserved during this motion?

1. E is conserved during this motion.
2. \( p \) is conserved during this motion.
3. Both E and \( p \) are conserved during this motion.
4. Neither E nor \( p \) is conserved during this motion.
Open Response (Worth up to 25 points): Given two identical masses \( m_1 = m_2 = 3 \text{ kg} \). The first mass \( m_1 \) is moving with a velocity \( v_1 \) immediately before colliding with \( m_2 \) (initially at rest), which is suspended by a string of length 1 m. The two masses are stuck together as a result of the collision. The compound system then swings to the right and rises to the horizontal level B. What is \( v_1 \), the speed of \( m_1 \) immediately before the collision?

*HINT: You’ll need conservation of energy & conservation of momentum here!*