Questions 1 - 9 (each 5 points × 8 = 40 (+ 5 bonus points)) are multiple choice questions. Please read statements for each question, provide reasons, show short calculations, if necessary, and circle (both in here and in SCANTRON) the correct statement/option.

Questions 10 & 11 (each 30 points × 2 = 60 points) have several parts and require calculations/derivations. Please be as clear as possible explaining the notations, symbols, use of formulae, etc.

Useful formulae and informations

SI units: meter, kilogram, and second acceleration due to gravity $g = 9.8 \text{ m/s}^2$ due south

$$x = \left(\frac{v_{x0} + v_x}{2}\right) t, \quad v_x = v_{x0} t + a_x t, \quad x = v_{x0} t + \frac{1}{2} a_x t^2, \quad v_x^2 = v_{x0}^2 + 2 a_x x$$

$$y = \left(\frac{v_{y0} + v_y}{2}\right) t, \quad v_y = v_{y0} t + a_y t, \quad y = v_{y0} t + \frac{1}{2} a_y t^2, \quad v_y^2 = v_{y0}^2 + 2 a_y y$$

1 m = 100 cm 1 cm = 10 mm 1 km = 1000 m 1 mile = 1.6 km
1 hour = 3600 s 1 mile/hour = 1.6 km/hour = 0.447 m/s

$$A_x = A \cos(\theta) \quad |A| = \sqrt{A_x^2 + A_y^2}$$

$$A_y = A \sin(\theta) \quad \theta = \tan^{-1} \left( \frac{A_y}{A_x} \right)$$