Hovercraft Answer Key
If they miss units, take off .5, no sig figs.

1. Dagobert Muller
2. Saunders Roe, Vicker Armstrong, William Denny, Britten Norman, Folland
3. Glidemobile
4. high-pressure air was blown into annular area between two concentric cans, producing a ring of airflow, which also contained a sheet of fast moving air (any approximate explanation is acceptable)
5. Hoverwork API - 88

1. X = (v^2sin(2Θ))/g
2. a) 45 degrees
    a. Simply maximize sin(2 theta)

    b) B → Once again, maximize sin(2 theta)
3. 10.392km/h north **(1 for the diagram, 1 for the answer)**
    a. Create two vectors, the x's (east/west) end up canceling leading to only a y (north) direction
4. 64.872 m/s, (22.16 m, 60.88 m)
    a. Range equation for (x,y) magnitude
        i. (v^2sin(2Θ))/g = 64.872 m
    b. Add in z dimension **(one for setting up the z, one for the answer)**
        i. 64.872 m is total distance
        ii. 70 degrees from the x axis is (20 degrees east (x) of north (z))
        iii. sin(theta) and cos(theta)
        iv. (x,z) = 22.16 m, 60.88 m
5. cosß=- cos(ß+20) → 80 degrees **(one for the formula, one for the answer)**

1. This is a long one
    a. It has no y velocity at its apex, therefore 8.66 m/s (horizontal) (10cos30)
    b. Range equation/2 = 4.415 m
    c. Conservation of momentum **(one for formula, one for answer)**
        i. m1v1=(m1+m2)vf
        ii. vf=1.44m/s
    d. Period = 2*pi*sqrt(l/g) **(one for formula, one for answer)**
        i. Time = period/2
        ii. Time = 1.1 seconds
2. Slightly easier
    a. .624*9.81 = 6.1152 Newtons **(one for formula, one for answer)**
    b. Fb=mass of displaced fluid * g
        i. Mass of displaced fluid = density of water * volume (4/3*pi*r^3)
        ii. Fb= 73.7 N
        iii. Therefore it floats
    c. 6.3/73.7 = 8.5% submerged **(one for formula, one for answer)**

Hovercraft Answer Key
If they miss units, take off .5, no sig figs.

3. If you don't know fluids, learn it (1 point per each thing)
    a. Relative density = specific gravity = Density fluid/ density water = .85 (no units)
    b. Kinematic viscosity = dynamic viscosity / density = 5.88m^2/sec
4. More fluids
    a. p=pgh, = 117.2 kN/m^2
    b. p=p1+p2 = 218.7 kN/m^2
5. AP problems -- the directions might be different based on frame of reference
    a. a= gsin(theta)
    b. v=-v0+gtsin(theta)
    c. x=D-v0t+.5gtsin(theta)
    d. x=D-(v0)^2/(2gsin(theta)) **(1 for setting up the equation, 1 for the substitution)**