**IB Physics Mock Test on Chapters 5 and 6**

**1. An elevator motor speeds up a 543 kg elevator from 5.0 m/s to 9.0 m/s, accelerating the elevator upwards over a distance of 7.5 m. There is a constant friction force of 850 N opposing the elevator.**

A. What is the elevator’s change in kinetic and potential energy? (+15,204 J KE, +39,951 J PE) – with no SF

B. What force must the motor exert on the elevator? (8,204 N)

C. What force must the motor exert to make the elevator move at a constant speed? (6,177 N)

**2. – A collection of random energy questions:**

A. A motor does 3120 J of work in 1.2 minutes, what is its power? What work would it do in 5.0 minutes? (43 W, 13,000 J)

B. You throw a 0.145 kg ball straight up from rest exerting a force of 37.0 N vertically for 1.20 m. At what elevation (above the lowest point) is the ball going 14.5 m/s? (20.5 m)

C. Fred throws a 0.357 kg ball straight downward at 12.0 m/s from the top of a 22.0 m tall cliff. What was the average force of air friction if the ball strikes the ground with a velocity of only 17.0 m/s (2.33 N)

**3. Red Elk twirls a 2.10 kg stone at a constant velocity on the end of a 35.0 cm long string with a period of 0.850 seconds.**

A. What is the tension in the string at the top and at the bottom? (19.6 N down, +60.8 N up)

B. What would be the velocity of the stone if there were a tension of 78.0 N at the bottom? (3.09 m/s)

C. A centrifuge spins with a period of 0.0150 seconds, and a radius of 23.0 cm. What is the centripetal acceleration in “g”s at the edge of the centrifuge, and what is the tangential velocity at this point? (4110 “g”s, 96.3 m/s)

**4. A planet with mass 6.21x1024 Kg has a moon of mass 1.17x1021 Kg that orbits with a speed of 1021 m/s.**

A. What is the distance between the moon and the planet? (3.97x108 m)

B. What would be the period of the moon’s orbit if the moon were 1.78x108 m from the planet? (7.33x105 s)

C. If a 12.5 kg object on the surface of that planet weighed 104 N, what is its radius? (7.06x106m)