PHYS 201    Study Guide for Test #2    Chap 4,5,6,&7

Format will be similar to Test #1, consists of MC and regular questions and problems.

Equations will be provided.

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| 1. | 2. | 3. | 4. |
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Chapter 4: Forces and Newton's Laws of motion

Terms: Force; contact and non-contact forces, mass, inertia, weight; true weight and apparent weight, and friction; static and kinetic.

1. Newton's laws of motion and Free-body diagrams.

2. Problem solving using Newton's second law,
€ Σ**F** = m**a**.

3. Problem solving using Newton's law of universal gravitation,
 
4. Solving friction problems,
  

Chapter 5: Dynamics of Uniform Circular Motion

Terms: Period of a circular motion, centripetal acceleration, centripetal force, weightlessness, and artificial gravity.

1. Solving circular motion problems using centripetal force,
  $v= \frac{2πr}{T}$

2. Some examples of circular motions and their centripetal forces.

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| **Circular Motion** | **Centripetal Force** |
| Satellite in orbit around Earth | Gravitational force of the Earth |
| Car moving around a flat-curve | Static frictional force |
| Car moving around a banked-exit | Static frictional force and normal force (partial) |
| Toy-plane tied to a rope and moving in a circle | Tension in the rope |
| Astronaut in a rotating space station | Normal force by the surface/floor |
| Rider at a roller coaster | weight and/or normal force |

Chapter 6: Work and Energy

Terms: Work, power, kinetic energy, work-energy theorem, potential energy, conservative and non-conservative forces, forms of energy, and conservation of energy.

1. Determining work for constant force and varying force.
    Constant force……….. *W* = (*F* Cos θ) × *d*.
 Varying force………….*W* = area under the Force VS. Displacement, curve.

2. Solving problems in conservation of mechanical energy using kinetic energy, KE and gravitational potential energy, GPE.
  
3. Solving problems using work-energy theorem.

4. Solving problems with work and power.
        *W* = (*F* Cos θ) × *d*. 

Chapter 7: Impulse and Momentum

Terms: Impulse, momentum, impulse-momentum theorem, conservation of momentum, collisions: elastic, inelastic, and completely inelastic.

1. Determining impulse for constant force and varying force.
    Constant force……….. ***J* = *F***x *t*.
 Varying force……….***J*** = area under the Force VS. Time, graph.

2. Solving problems using impulse-momentum theorem.
    ***J* = *F****t* = *m****vf*** − *m****vi***.

3. Solving one and two dimensional collision problems using conservation of momentum.
    ***p*** = *m****v***.