Beverly Hills High School -- Physics -- Test #3 -- 90 points

Write TRUE if the statement is true OR write the word(s) that substitute for the underlined word(s) that would make it true. Writing false only earns partial credit. Three points each. Use 9.8 m/s^2 for g.

_____ 1) A man jumps out of an airplane and continues to <u>accelerate</u> until the force of the air resistance equals the force of his weight and he reaches terminal velocity.

_____ 2) <u>Energy</u> equals mass times acceleration.

_____ 3) You can yank the tablecloth away from underneath dishes without disturbing them much because of Newton's <u>third</u> law.

_____ 4) Static <u>equilibrium</u> results when you hang motionless from a pull-up bar.

_____ 5) Since the gravity on the moon is one-sixth what it is on Earth, you would weigh <u>six times</u> as much on the moon as you do on Earth.

<u>Multiple Choice</u>. Circle the best choice for each example. Three points each.

6) You are in your car driving at about 35 miles per hour. As you make a left turn, your tires begin to squeal, meaning they are pulling off the road a bit. The coefficient of friction between your tires and the highway is most likely about

a) -1 b) 0 c) 0.1 d) 0.6 e) 1.2 f) infinite

7) Each man of an eleven man football team can pu11 a rope with a force of 1200 N. If six men are on the left side of a tug-of-war, and five line up on the right side, and everyone starts pulling, the flag in the middle feels a net force of

a) 7200 N b) 6000 N c) 13200 N d) 100 N e) 1200 N f) zero

8) Which one of these is not a force?

a) friction b) tension c) gravity d) m • a e) air resistance

9) Which of Newton's laws best explains why motorists should buckle up their seatbelts?

a) 1st Law b) 2nd Law c) 3rd Law d) Law of Gravity

10) If you blow up a balloon, then release it, it will fly away...best explained by which of Newton's Laws?

a) 1st Law b) 2nd Law c) 3rd Law d) Law of Gravity

11) You are an explorer on a newly discovered distant planet. On Earth you weigh 686 N. You find that on this new planet you weigh 891.8 N. What is the acceleration due to gravity on this new planet? Five points.

Using the vectors shown and a ruler, draw the resultant for the following vector combinations (three points):

12) $\vec{A} + 2\vec{B}$

13) $\vec{C} - \vec{A}$

14) A female US soldier fires a bazooka shell horizontally off a cliff at enemy tank some 315 m away. If the shell has an initial speed of 90 m/s and the shell hits the tank, how high was the cliff? Five points.

Short Answer/Fill-In Section. Be clear and neat. Read what you have written before handing it in. 3 points.

15) Hideki is pushing a refrigerator across the floor. Just to get it initially moving he has to overcome the _____ friction. Once it is moving, he has to overcome the _____ friction.

16) Mu, the coefficient of friction, normally has values between _____ and _____.

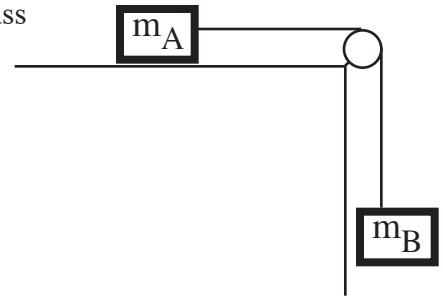
17) Newton's 3rd Law says that when you push against the wall, _____ _____ .

18) Isaac Newton was born in what country? _____

Calculation Section. Carefully and neatly solve each of the following. Show ALL your work for credit. You must also give the proper units in SI for full credit -- five points each.

19) Determine the acceleration a 1200 kg car experiences if a 5400 N net force is applied to it.

For the next three problems, use the diagram at the right of a cart with a mass of m_A sitting on a frictionless surface connected to a mass m_B hanging from a massless string over a pulley. Ten points.



20) What is the acceleration of the system...

a) if mass A equals mass B?

b) if mass B is half that of mass A?

c) if mass A is 196.2 kg and mass B is 312.7 kg?

21) A 320 N net force causes an object to accelerate at a rate of 4.0 m/s/s. If the mass were doubled and the net force was tripled, what would the new acceleration be?

22) State all three of Newton's Laws of Motion (no shortcuts - each one completely) - ten points.

1st Law: _____

_____

_____

2nd Law: _____

_____

3rd Law: _____

_____