Name _____ Hour _____

The Physics Q1 and Q2 Final Review

≈60 points Short answer and problems on _____

7-8 problems from the following types of problems:

- Angled or horizontal projectiles
- Conservation of momentum(a collision)
- Force and/or g-force
- Circular motion
- Gravitation
- Work/HP
- Conservation of energy problem into a horizontal projectile
- Vector problem-solved graphically
- Pendulums

10 points for bucket questions: 5 questions each worth 2 points _____

To be prepared for the Q2 Final:

- ☐ Put your **papers in order**, paperclip them together and store them in a safe place!
- ☐ Fill out the **bucket questions** and study them for bucket days on **Mon 1/25 and Tues 1/26**
- ☐ Attend Mrs. B's **Summary of Physics Q1-2** during class on Monday 1/25 (Find it online if you are absent)
- ☐ Complete some of the optional **review problems**

Optional Review Problems: **(4 possible stickers, 1 per completed page #5-8)**

Make sure to review what you don't know! Graphs (#1), Vectors (#3), Projectiles (#4-6), Forces (#7-8), Work and Energy (#9-11), momentum (#12-14), and circular motion/gravity/pendulums (#15-17).

****I highly recommend you review projectiles (#4-6) and #11!**

Organize all of your papers- This will help you later in the year!

QUARTER 1:

INTRODUCTION:

Conversion WS	Cars Lab	Math and Conversion Review

MOTION IN ONE DIMENSION:

Motion Graphing Lab	Notes for 1-D problems
Level 1: One-Dimensional Motion Problems	Level 2: One-Dimensional Motion Problems
1-D Motion Lab	Variable Quiz
1-D Motion Quiz	Review for One-Dimensional Motion Test

Name _____ Hour _____

VECTORS:

Notes and Problems for Vectors

Vector Quiz

PROJECTILE MOTION:

Projectiles Shot Horizontally- notes and problems
Angled Projectile notes
Angled Projectiles Level 2
Fun with 2-D Motion Lab
The Marble Lab
Angled Projectiles Level 1
Tennis Ball Lab
Projectile Motion Review-

QUARTER 2:

FORCES:

Forces Packet
Force notes
Other applications of F=ma
Elevator Lab
Review for Forces

WORK, POWER AND ENERGY:

Work and power notes, horsepower lab (stapled)
Energy notes
Summary with problems on back
Energy problems Level 1
Energy problems Level 2
Work/Power/Energy QUIZ
Practice Test
Physics of Toys lab

MOMENTUM:

Momentum notes/problems
Conservation of momentum notes/problems
Momentum problems

CIRCULAR MOTION, GRAVITY AND PENDULUMS:

Pigs Lab
Circular motion book assignment
Gravity notes
Level 1 problems
Level 2 problems
Summary of Circular motion and gravity
Circular motion/gravity QUIZ
Pendulum Lab
CM and gravity Review
CM and gravity Practice test
Summary of Q1-2

Name _____ Hour _____

Bucket Days on Everything for points ☺

You will have 5 questions each for 2 pts, worth a total of 10 points on your final.

Unit I) Introductory Material

1. How many centimeters are in one inch?
2. How many meters are in one mile?
3. How many centimeters are in 1 meter?
4. How many feet are in 1 meter?

Unit II) Motion in One-Dimension

5. What is Δx and what unit is it measured in?
6. What is Δy and what unit is it measured in?
7. What is the unit for velocity?
8. What is the unit for acceleration?
9. What unit is Δt typically measured in?
10. What quantity does the slope of a **distance vs. time** graph give you?
11. What quantity does the slope of a **velocity vs. time** graph give you?
12. What does a horizontal line on a **distance vs. time** graph mean?
13. What does a horizontal line on a **velocity vs. time** graph mean?
14. What does the area under a velocity vs. time graph give you?
15. When can we use $v = \Delta x / \Delta t$?
16. When is the acceleration of an object equal to -9.8 m/s^2?
17. If you throw an object straight up, what is the speed at the top of its flight?
18. If you throw an object up and it takes 4 seconds to reach the top, how long is it in the air?

Unit III : Vectors

19. Something that has only magnitude is called a _____
20. Something that has both magnitude and direction is called a _____
21. Give an example of a quantity that is a scalar. (m, Δt, v, a, f, etc)
22. Give an example of a quantity that is a vector. (m, Δt, v, a, f, etc)
23. What is the sum of two or more vectors called?

Unit IV : Projectile Motion

24. What does a_y equal?
25. What is v_x ?
26. What is v_{iy}?
27. If you drop a bullet and shoot a bullet horizontally from the same height, which one will hit first if there is no air resistance?
28. If an object is shot **horizontally**, what does v_{iy} equal?
29. An object that once in the air can't control its own motions is called a _____
30. What happens to the velocity of a projectile in the x direction throughout its flight?
31. What happens to the Vy as the Δ**y increases** during the flight of an angled projectile?
32. What happens to the Vy as the Δ**y decreases** during the flight of an angled projectile?
33. What is v_{fy} ?
34. What unit is v_{iy} measured in?

Unit V: Newton's Laws and Forces

35. What is a force?
36. What unit do we typically use to measure force?
37. What is Newton's 1st Law?
38. What is Newton's 2nd Law?
39. What is Newton's 3rd Law?
40. Which one of Newton's Laws says that for every action there is an equal and opposite reaction?
41. Which one of Newton's Laws says F=ma?
42. Which one of Newton's Laws is this?
    a. *An object at rest remains at rest and an object in motion remains in motion unless acted upon by an outside force?*

43. The property of matter to resist changes in motion is the definition for _____
44. If an object is in equilibrium, what is the sum of all of the forces acting on it?
45. A 400-N woman sits on the floor. What force does the floor exert on her?
46. Which has more mass, a kilogram of feathers or a kilogram of iron?
47. What is mass and what unit is it in?
48. What is weight and what unit do we measure it in?
49. What variable do you get when you divide force by acceleration?
50. What **UNIT** do you get when you divide force by acceleration?
51. What your weight down is equal to the force of air resistance up, this is called _____
52. What is the acceleration of an object equal to when it reaches terminal velocity?
53. What is a g force?
54. 1 g is equal to your mass multiplied by what?
55. What does it mean if you are feeling 3 g's of force?

Unit VI: Work and Energy

56. What is the unit for work?
57. How many Watts are in a **kilowatt**?
58. How many Watts are in one **horsepower**?
59. What is one of the three units we use for power?
60. What unit for power will come out in the equation $P = W / \Delta t$?
61. The energy of position is known as _____
62. The energy of motion is known as _____
63. What is the **kinetic energy** of a cat that is sitting still and is 2 meters off the ground?
64. The conservation of energy states that the total energy remains _____.
65. What unit is energy measured in?
66. What quantity do we measure in Watts?
67. A baseball is dropped off a roof. As it falls, what happens to its potential energy?
68. A baseball is dropped off a roof. As it falls, what happens to its kinetic energy?

Unit VII: Momentum and Collisions

69. What is the variable (the letter) for momentum?
70. What is the unit for momentum?
71. What is the momentum of a school bus parked outside?
72. What is the equation for momentum?
73. When you catch a water balloon, what variable do you control as you cradle it?
74. What two variables does momentum depend on?
75. The conservation of momentum states the total momentum remains _____ during a collision.
76. What type of collision has occurred when two objects collide and bounce apart?
77. What type of collision has occurred when two objects collide and stick together?

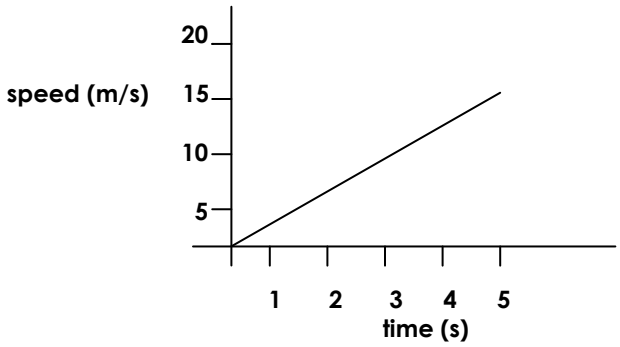
Unit VIII: Circular Motion and Gravity

78. What does "T" stand for in circular motion equations?
79. What does "T" stand for in the pendulum equation?
80. What is the variable for period?
81. What unit is the period measured in?
82. Centripetal force is the force required to keep an object _____.
83. Which one is just inertia, centrifugal force or centripetal force?
84. What happens to the acceleration due to gravity as you move further away from the earth's surface?
85. What is the difference between g and Fg?
86. The Universal Law of Gravitation (gravitational force) depends on what 2 things?
87. In order for an object to stay in a consistent orbit, what two forces must be equal?
88. In the pendulum equation, what is the letter L?
89. When you increase the length of a pendulum, how does it affect the period?
90. When you increase the mass of a pendulum, how does it affect the period?
91. An object moving at constant speed in a circle is accelerating because…
92. Newton believed every object _____ every other object.

Name _____ Hour _____

1-D Motion:

1. Use the graph below to answer the following questions:



a. What is the slope of the line? What does the slope represent? _____

b. What unit do you end up with if you multiply speed x time? _____

c. Use a 1-D equation to determine how far the object traveled in 5 seconds? (37.5 m)

2. A cat is dropped from rest on a planet on which the acceleration due to gravity is not known. If the cat falls 2.1 meters in 1.0 sec, how far will the cat have dropped at the end of 6 seconds? ***(ans. -75.6 m)***

Vectors:

3. Add the following vectors graphically: **A** = 5.3 m at 20° N of W, **B =** 3 m at 30° N of E
(***about 4.1m at 35.7° W of N)***

Name _____ Hour _____

Projectile Motion:

4. A plane that is delivering insecticides to crops is traveling horizontally at 20 m/s at a height of 51 meters. The pilot is aiming for a particular spot on the field below. How far (Δx) before he is over that spot should the pilot drop the insecticides? ***(ans. 64.5 m)***

5. A baseball is hit at 30.0 m/s at an angle of 53° N of E.
   a. Calculate how far it traveled horizontally. (88m)

   b. Calculate its maximum height. (29.3 m)

6. You throw a football at some angle N of E, and it lands 28.3 m away 3.0 sec later. Find the velocity and the angle of the ball in **miles per hour** just as it leaves your hand. You will first need to find Vx and Viy before you can find the V. *(39 mph at 57° N of E)*

   Vx = _____

   Viy = _____

   V = _____

   θ = _____

Newton's Laws of Motion:

7. A 2,000-**pound** car initially traveling at 46 **mph** takes 2.4 seconds and 14 meters to stop. Find the force needed to stop the car**.** (-7,800 N. Why is it negative?)

Name _____ Hour _____

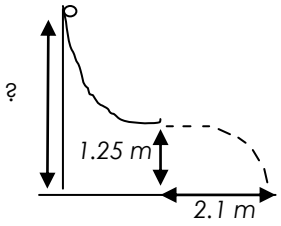
8. You (mass 55 kg) and your friend (mass 60 kg) experience 1,120 N of force at the bottom of the hill on a rollercoaster. How many g's is this for you and for your friend? (2.08 and 1.9)

Work and Energy:

9. A 2,000 **lb.** car goes from 0 to 20 m/s in 4.2 seconds. Calculate the horsepower of the engine. (58 hp)

10. You are trying to hit the target placed on the floor. A marble with a mass of 0.45 grams, is held at a height of 0.32 meters above a table top. It is then let go and it cut by a razor blade that is 1.03 m above the floor. How far away horizontally (Δx) on the floor should the target be placed so that the marble will hit it? (1.15 m)

11. A ball with a mass of 522 **grams** starts from rest and rolls down a track. If it leaves the track horizontally, at what height (Δy) above the ground was the ball when it started? Solve using conservation of energy and projectiles. (2.1 m)



Momentum:

12. A 0.25 kg softball initially moving at 18 m/s is caught by a pitcher. The pitcher brings it to a stop in 0.2 seconds. What force does the pitcher need to exert to stop it? (-22.5 N)

Name _____ Hour _____

13. You (mass 50 kg) and a friend (mass 60 kg) are skating and push off of each other. If you travel at 3 m/s backwards, at what speed will your friend travel at? (2.5 m/s)

14. A 5-kg bowling ball traveling at 2.4 m/s strikes a stationary 2.5- kg pin which moves off at 3.3 m/s. Find speed of the bowling ball after the collision. (0.75 m/s)

Circular Motion and Gravity:

15. Let's say you weigh 153 pounds on the earth's surface. Calculate your weight (in N) if you traveled to a distance that is 4,000 **miles** above the surface of the earth. ***(169.1 N)***

16. You (mass = 100 kg) are riding the swings at MOA. If the radius of the ride is 3.5 m and your velocity hits 15 mph, find your **centripetal force** and **# of g's**. (1284 N, 1.31 g's)

17. Calculate how long a pendulum would need to be on the moon in order to have a period of 2.4 sec. (0.24 m)