

Name key

Hour \_\_\_\_\_

10	+	10	=	20
Bucket ?		Problems		Total
p. 1-3		p. 4-6		

### Q3 FINAL REVIEW

≈60 points Short answer and problems on **WEDNESDAY 3/30**

6-7 of the following types of problems:

- Angled/Horizontal projectile
- conservation of momentum/energy
- Force and g-forces
- Circular motion and gravity
- Work/Horsepower
- Mirror/Lens diagram/equations
- Sound

≈35 points Multiple choice (no math) from the bucket questions on **THURSDAY 3/31**

10 points for filling out the bucket questions (p. 1-3)

10 points for review problems (p. 4-6)

**POSSIBLE BUCKET QUESTIONS: - Answer all for 10 pts!**

1. How many centimeters are in one inch? 2.54
2. How many meters are in one mile? 1609
3. How many centimeters are in 1 meter? 100

**Motion in One-Dimension**

4. What is  $\Delta x$ ? horz. distance
5. What unit is  $\Delta x$  measured in? m
6. What is  $\Delta y$ ? vertical distance
7. What unit is  $\Delta y$  measured in? m
8. What is the unit for velocity? m/s
9. What is the unit for acceleration? m/s<sup>2</sup>
10. What unit is  $\Delta t$  typically measured in? sec
11. What quantity does the slope of a **distance vs. time** graph give you? m/s - speed or velocity
12. What quantity does the slope of a **velocity vs. time** graph give you? m/s<sup>2</sup> - acceleration
13. What does a straight line (horizontal) on a **distance vs. time** graph mean? not moving
14. What does a straight line (horizontal) on a **velocity vs. time** graph mean? moving at constant speed
15. What does the **area** under a velocity vs. time graph give you? m/s · s = m - distance
16. If you throw an object straight up, what is the speed at the top of its flight? 0
17. If you throw an object up and it takes 4 seconds to reach the top, how long is it in the air? 8 sec
18. If you throw an object straight up and it is in the air for 3 seconds, how long did it take to reach the top of its flight? 1.5 sec

**Vectors:**

19. Something that has only magnitude is known as a scalar / vector.
20. Something that has both magnitude and direction is known as a scalar / vector.
21. Which quantity is scalar? Mass / acceleration
22. Which quantity is a vector? Mass / acceleration
23. What is the sum of two or more vectors called? resultant

**Projectile Motion**

24. What is  $v_x$ ? horz. velocity
25. What is  $v_{iy}$ ? initial vertical velocity
26. Because there is no acceleration in the x-direction, you can't interchange  $\Delta x$  and  $\Delta y$  in 2-D motion
27. If an object is shot horizontally, what does  $v_{iy}$  equal? 0
28. A projectile is an object that can't control its own motion in the air
29. Give an example of a projectile. ball

30. What happens to the velocity of a projectile in the x direction throughout its flight? *constant*
31. What happens to the  $V_y$  as the  $\Delta y$  increases during the flight of an angled projectile? *decreases*
32. What happens to the  $V_y$  as the  $\Delta y$  decreases during the flight of an angled projectile? *increases*
33. What unit are  $v_{iy}$  and  $v_x$  measured in? *m/s*

**Newton's Laws and Forces**

34. A force is a push or a pull
35. What is the unit of force? *N*
36. Which one of Newton's Laws says that for every action there is an equal and opposite reaction? *1st 3rd*
37. Which one of Newton's Laws says  $F=ma$ ? *2nd*
38. Which one of Newton's Laws is the law of inertia? *1st*
39. Inertia is the property of matter to resist changes in motion.
40. If an object is in equilibrium, what is the sum of all of the forces acting on it? *0*
41. A 400-N woman sits on the floor. What force does the floor exert on her? *400 N*
42. Which has more mass, a kilogram of feathers or a kilogram of iron? *same*
43. The amount of matter in an object is the definition for mass.
44. What **unit** is mass measured in? *kg*
45. How much gravity pulls on your mass is the definition for weight
46. What **unit** is weight measured in? *N*
47. What **variable** do you get when you divide force by acceleration? *m*
48. What **UNIT** do you get when you divide force by acceleration? *kg*
49. What is the acceleration of an object equal to when it reaches terminal velocity? *0*
50. What is a g force? *how many x your weight you are experiencing*
51. 1 g is equal to your mass multiplied by what number? *9.8*
52. What does it mean if you are feeling 3 g's of force? *3 x heavier*

**Work and Energy**

53. What is the unit for work? *J*
54. How many Watts are in a kilowatt? *1000*
55. How many Watts are in one horsepower? *746*
56. What is one of the three units we use to measure power? *watts, hp, J/sec*
57. What unit for power will come out in the equation  $P = W / \Delta t$ ? *watts*
58. Potential energy is the energy of position/height
59. Kinetic energy is the energy of motion
60. What is the **kinetic energy** of a cat that is sitting still and is 2 meters off the ground? *0*
61. The conservation of energy states that the total energy remains constant.
62. What unit is energy measured in? *J*
63. A baseball is dropped off a roof. As it falls, what happens to its **potential** energy? *decreases*
64. A baseball is dropped off a roof. As it falls, what happens to its **kinetic** energy? *increases*

**Momentum and Collisions**

65. What is the variable (the letter) for momentum? *P*
66. What is the unit momentum is measured in? *kg·m/s*
67. What is the momentum of a school bus parked outside? *0*
68. What two variables does momentum depend on? *mass, velocity*
69. The conservation of momentum states the total momentum remains constant during a collision.
70. The collision when two objects collide and bounce apart is elastic / inelastic
71. The collision when two objects collide and stick together is elastic / inelastic

**Circular Motion and Gravity**

72. What does "T" stand for in circular motion equations? *Period - time to make 1 revolution*
73. What does "T" stand for in the pendulum equation? *Period - time to swing bucket & forth once*
74. What is the variable (the letter) for period? *T*
75. What **unit** is the period measured in? *sec*
76. What happens to the value of gravity as you move further away from the earth's surface? *↓*
77. The Universal Law of Gravitation states that all things attract each other.

78. The gravitational force depends on what 2 things? *mass + distance*  
 79. In order for an object to stay in a consistent orbit, what two forces must be equal?  $F_g = F_c$   
 80. In the pendulum equation, what is the letter L? *length*  
 81. When you increase the length of a pendulum, how does it affect the period? *↑ - longer time*  
 82. When you increase the mass of a pendulum, how does it affect the period? *no effect*  
 83. An object moving at constant speed in a circle is accelerating because it is changing *direction*

### Waves and Sound

84. What do you call a transfer of energy from one point to another with no transfer of mass? *wave*  
 85. The type of wave in which particles vibrate perpendicularly to the direction of the motion. *transverse*  
 86. The type of wave in which particles vibrate parallel to the direction of the motion. *longitudinal*  
 87. What is the high point of a transverse wave known as? *crest*  
 88. What is the low point of a transverse wave known as? *trough*  
 89. What is the unit for frequency? *Hz*  
 90. What other unit is the same as a Hertz? *1/sec*  
 91. What is the name of the letter for wavelength? *lambda -  $\lambda$*   
 92. What is the distance from one part of a wave until it repeats known as? *wavelength ( $\lambda$ )*  
 93. What do we call the time it takes for one wave to pass a given point? *period (T)*  
 94. What unit is loudness of sound measured in? *decibels*  
 95. What occurs when the freq of an applied force matches the natural freq of the object? *resonance*  
 96. What is the part of a standing wave where little or no vibrations occur? *node*  
 97. What is the part of a standing wave where the maximum vibrations occur? *antinode*  
 98. What does FM stand for? *Freq. mod.*  
 99. What does AM stand for? *amplitude modulation*  
 100. What are the frequency units for FM radio stations? *MHz*  
 101. What are the frequency units for AM radio stations? *KHz*  
 102. What is the name for the material through which a wave is traveling? *medium*  
 103. What is the number of waves that pass a given point each second known as? *frequency*  
 104. What is another way to say twice the speed of sound? *Mach 2*  
 105. A car drives by honking its horn. The pitch sounds high and then goes lower. What is the name of the effect that causes this? *doppler effect*  
 106. What is the loud noise made when objects travel faster than sound? *sonic boom*  
 107. What is the lowest frequency of vibration for a standing wave known as? *fundamental freq.*

### Light, Mirrors and Lenses

108. What is the speed of light?  *$3 \times 10^8 \text{ m/s}$*   
 109. What is the variable (the letter) for the speed of light? *c*  
 110. What is the equation for speed of a light wave?  *$c = f\lambda$*   
 111. If you increase the frequency of light, what happens to the wavelength? *↓*  
 112. What type of relationship (direct or inverse) do frequency and wavelength have? *inverse*  
 113. Which type of **mirror** has a negative focal length? *convex*  
 114. Which type of **lens** has a negative focal length? *diverging*  
 115. What is the variable for focal length? *f*  
 116. What is the variable for **object distance** to a mirror or lens? *p*  
 117. What is the variable for **image distance** to a mirror or lens? *q*  
 118. What is the variable for image height? *hi*  
 119. What is the variable for object height? *ho*  
 120. What is the variable for magnification? *m*  
 121. q is negative for **mirrors** when the image is in front of *behind* the mirror  
 122. q is negative for **lenses** when the image is on the *same* / opposite side of lens as the starting object.  
 123. Which type of lens makes light rays come together? *converging*  
 124. Which type of lens spreads light rays out? *diverging*  
 125. What does refraction mean? *bend*  
 126. What does reflection mean? *bounce off*  
 127. What does a magnification of 0.5 mean? *50% original size*  
 128. What does a magnification of 10 mean? *10x bigger*