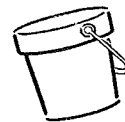




Name \_\_\_\_\_

Hour \_\_\_\_\_



## Q1-Q3 BUCKET QUESTIONS



### Unit I) Introductory Material (Chapter 1)

1. What does it mean that physics is cumulative? *builds throughout the year*
2. What does SI stand for? *(it's in your book in Ch. 1) system international*
3. How many centimeters are in one inch? *2.54*
4. How many meters are in one mile? *1609*



### Unit II) Motion in One-Dimension (Chapter 2)

5. What does that mean when we say motion in one-dimension? *moving 1 way only*
6. What is  $\Delta x$  and what unit is it measured in? *horz. distance - m*
7. What is  $\Delta y$  and what unit is it measured in? *vert. " - m*
8. Why can you interchange  $\Delta x$  and  $\Delta y$  in the one-dimensional motion equations? *only moving 1 way*
9. What is the unit for velocity? *m/s*
10. What is the unit for acceleration? *m/s<sup>2</sup>*
11. What unit is  $\Delta t$  typically measured in? *change in time, sec*
12. What quantity does the slope of a distance vs. time graph give you? *m/s*
13. What quantity does the slope of a velocity vs. time graph give you? *m/s<sup>2</sup>*
14. What does a straight line on a distance vs. time graph mean? *not moving*
15. What does a straight line on a velocity vs. time graph mean? *moving at constant speed*
16. What does the area under a velocity vs. time graph give you? *m.s = m (distance)*
17. When can we use  $v = \frac{\Delta x}{\Delta t}$ ? *constant velocity*
17. When is the acceleration of an object equal to  $-9.8 \text{ m/s}^2$ ? *falling objects*
18. When you drop an object near the earth's surface, what two variables do you know?  *$v_i = 0$   $a = -9.8 \text{ m/s}^2$*
19. If you throw an object straight up, what is the speed at the top of its flight? *0*
20. If you throw an object up and it takes 4 seconds to reach the top, how long is it in the air? *8 sec*
21. 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*

### Unit III: Vectors (Chapter 3 - 1<sup>st</sup> half)

22. What is a scalar? *magnitude*
23. What is a vector? *magnitude + direction*
24. Give an example of a quantity that is a scalar. *mass*
25. Give an example of a quantity that is a vector. *acceleration, force, velocity*
26. What is the sum of two or more vectors called? *resultant*
27. What does it mean to add two vectors graphically? *solve graphically*
28. What does it mean to add two vectors by resolution into components? *breaking into x + y*

### Unit IV: Projectile Motion (Chapter 3 - 2<sup>nd</sup> half)

29. What does  $a_y$  equal? *-9.8*
30. What is  $v_x$ ? *velocity in x direction*
31. What is  $v_{iy}$ ? *initial " y "*
32. Is  $v_x$  measure the same thing as  $\Delta x$ ? *no!*
33. Why can't you interchange  $\Delta x$  and  $\Delta y$  when solving two-dimensional motion problems? *y direction has acc x direction does no.*
34. If you drop a bullet and shoot a bullet horizontally from the same height, which one will hit first in a vacuum where there is no air resistance? *none*
35. If you drop a bullet and shoot a bullet horizontally from the same height, which one will hit first when there is air resistance? *drop*
36. If an object is shot horizontally, what does  $v_{iy}$  equal? *0*
37. What is a projectile? *object that can't control its own motion*
38. Give an example of a projectile. *football, bullet*
39. What Greek letter do we use to represent an angle?  *$\theta$  (theta)*
40. If a projectile is fired at an angle, which trigonometric expression can we use to find  $v_x$ ? *cosine*
41. What happens to the velocity of a projectile in the x direction throughout its flight and why? *constant*



42. What happens to the velocity of a projectile in the y direction throughout its flight and why? *decreases going up, increases going down (gravity!)*
43. What is  $v_{iy}$ ? *0*
44. Why do we split vector  $v$  into  $v_x$  and  $v_y$  before solving problems? *V is a combo of u in x + y direction*

### Unit V: Newton's Laws and Forces (Chapter 4)

45. What is a force? *push or pull*
46. What unit do we typically use to measure force? *N*
47. What is Newton's 1<sup>st</sup> Law? *Inertia*
48. What is Newton's 2<sup>nd</sup> Law?  *$F = ma$*
49. What is Newton's 3<sup>rd</sup> Law? *every action has equal + opposite reaction*
50. What exactly is a Newton? *(not just a unit of force - you need to give the actual definition) force needed to accelerate 1 kg at 1 m/s<sup>2</sup>*
51. Which one of Newton's Laws says that for every action there is an equal and opposite reaction? *3*
52. Which one of Newton's Laws says  $F = ma$ ? *2*
53. Which one of Newton's Laws is this? *1*

*An object at rest remains at rest and an object in motion remains in motion with a constant velocity unless the object experiences a net external force?*

54. What is inertia? *property of matter to resist changes in motion*
55. When jumping out of a plane with a parachute, what two forces are acting on you? *gravity, air resistance*
56. What is the mathematical relationship between vector  $F$ ,  $F_x$  and  $F_y$ ?  *$F^2 = F_x^2 + F_y^2$*
57. What is meant by net external force? *sum all forces acting upon you*
58. If an object is in equilibrium, what is the sum of all of the forces acting on it? *0*
59. A 400-N woman sits on the floor. What force does the floor exert on her? *400 N*
60. Which has more mass, a kilogram of feathers or a kilogram of iron? *neither!*
61. What is mass and what unit is it in? *amount of matter - kg*
62. What is weight and what unit do we measure it in? *force of gravity on mass (N)*
63. What quantity do you get if you divide weight by mass? *acc*
64. What is terminal velocity? *largest vel. falling object can reach*
65. What is the acceleration of an object when it reaches terminal velocity? *0*
66. What is a g force? *how many times your weight you are experiencing*
67. If you know your mass in kilograms, how could you find out what one g force for you in Newtons? *x gravity*
68. What is meant by a negative g? *feel lighter*
69. How do you find the number of g's? *total force / m.g*

### Unit VI: Work and Energy (Chapter 5)

70. What is the unit for work? *J*
71. How many Watts are in a kilowatt? *1000*
72. How many Watts are in one horsepower? *746*
73. What are the three units we use for power? Which one is the one that will come out in the equations? *watt, kW, hp*
74. What is potential energy (P.E.)? *energy of position*
75. What is kinetic energy (K.E.)? *energy of motion*
76. What is the kinetic energy of a cat that is sitting still and is 2 meters off the ground? *0*
77. What is the conservation of energy? *initial energy = final energy*
78. What quantity do we measure in Joules? *(3 possible answers) energy*
79. What quantity could be measured in Newton-meters? *work, energy*
80. What quantity do we measure in Watts? *Power*
81. A baseball is dropped off a roof. As it falls, what happens to its potential energy? Its kinetic energy? *decreases, increase*

### Unit VII: Momentum and Collisions (Chapter 6)

82. What is the variable for momentum? *P*
83. What is the unit for momentum? *kg.m/s*
84. What is the momentum of a school bus parked outside? *0*
85. What is the equation for momentum?  *$p = m \cdot v$*
86. What is impulse? *change in momentum*
87. When you catch a water balloon, what variable do you control as you cradle it? *0 t*
88. What two variables does momentum depend on? *mass, velocity*
89. What is the conservation of momentum?  
*initial p = final P*

90. What is an elastic collision? *2 objects collide + bounce off*  
 91. What is an inelastic collision? *2 objects collide + stick together*  
 92. Give and explain a real-life example when the concept  $F\Delta t = m\Delta v$  is used. *seat belt*

### Unit VIII: Circular Motion and Gravity

93. What does "T" represent and what does it mean? *period - time to make 1 rotation complete circle*  
 94. What is period when it comes to circular motion? *"*  
 95. What is the period for the earth's rotation on its axis? *24 hrs*  
 96. What is the period for the earth rotating around the sun? *365 days*  
 97. What is the equation for the speed when an object is moving in a circle at a constant speed?  $v = \frac{2\pi r}{T}$   
 98. What is the difference between centrifugal force and centripetal force? Which one is not a force?  
 99. What happens to the acceleration due to gravity as you move further away from the earth's surface? *force outward, force required to maintain circular motion decreases*  
 100. What does the Universal Law of Gravitation tell us? *everything attracts everything else*  
 101. In order for an object to stay in a consistent orbit, what two forces must be equal?  $F_c = F_g$   
 102. In the pendulum equation, what is the letter L? *length*  
 103. When you increase the length of a pendulum, how does it affect the period? *slower*  
 104. When you increase the mass on the end of a pendulum, how does it affect the period? *no effect*

### IX: Waves and Sound (Chapter 12 and Chapter 13)

105. What do you call a transfer of energy from one point to another with no transfer of mass? *wave*  
 106. Why type of wave has particles which vibrate perpendicularly to the direction of the motion? *transverse*  
 107. What type of wave has particles that vibrate parallel to the direction of motion of the wave? *longitudinal*  
 108. What is the high point of a transverse wave known as? *crest*  
 109. What is the low point of a transverse wave known as? *trough*  
 110. What is the area of greater concentration in a longitudinal wave known as? *compression*  
 111. What is the area of lesser concentration in a longitudinal wave known as? *rarefaction*  
 112. What is the unit for frequency? *Hz*  
 113. What other unit is the same as a Hertz? *1/sec*  
 114. What is the name of the letter for wavelength? *lambda*  
 115. What is the distance from one part of a wave until it repeats known as? *wavelength*  
 116. What do we call the time it takes for one wave to pass a given point? *period*  
 117. What is the name of sounds with frequencies less than 20 Hz? *infrasound*  
 118. What unit is sound level is measured in? *decibel*  
 119. What occurs when the frequency of an applied force matches the natural frequency of the object? *resonance*  
 120. What is the part of a standing wave where little or no vibrations occur? *node*  
 121. What is the part of a standing wave where the maximum vibrations occur? *antinode*  
 122. What does FM stands for? *freq. modulation*  
 123. What does AM stands for? *amplitude*  
 124. What are the units for FM radio stations? *MHz*  
 125. What are the units for AM radio stations? *KHz*  
 126. What is the approximate speed of sound in meters per second? *330 m/s*  
 127. What is the name for the material through which a wave is traveling? *medium*  
 128. What is the number of waves that pass a given point each second known as? *freq*  
 129. When two crests meet, what type of interference do you get? *constructive*  
 130. When a large crest and a big trough meet, you get what type of interference? *destructive*  
 131. What is the name of the famous bridge that collapsed due to resonance? *tacoma narrows*  
 132. What is another way to say twice the speed of sound? *mach 2*  
 133. A car drives by honking its horn. The pitch sounds high and then goes lower. What do we call this? *Doppler effect*  
 134. What is the loud noise made when objects travel faster than sound? *sonic boom*  
 135. What do we call sounds that range from 20-20,000 Hz? *audible*  
 136. What is the name for a place on a baseball bat that if you hit it a standing wave is created? *sweet spot*  
 137. What is the name for sounds with frequencies higher than 20,000 Hz? *ultrasound*  
 138. Who was the first American to break the sound barrier? *Chuck Yeager*  
 139. What is the lowest frequency of vibration for a standing wave known as? *fundamental freq.*  
 140. What do you call the series of frequencies w/fundamental frequency and integer multiples of it?  
*harmonic series*



**X: Light, Mirrors and Lenses** (Chapter 14 and Chapter 15)

141. What is the speed of light?  $3 \times 10^8 \text{ m/s}$
142. What is the equation for speed of a light wave?  $c = f\lambda$
143. If you increase the frequency of light, what happens to the wavelength? ↓
144. What type of relationship (direct or inverse) do frequency and wavelength have? inverse
145. Which color light has a greater frequency: Red (700 nm) or Purple (450 nm)? Purple
146. Which type of mirror has a negative focal length? convex
147. If a mirror has a radius of curvature of 10 centimeters, what is its focal length? 5 cm
148. What is 'C' for mirrors and lenses? radius / center of curvature
149. What is 'f' for mirrors and lenses? focal length
150. What is 'p' for mirrors and lenses? distance object to mirror / lens
151. What is 'q' for mirrors and lenses? " image to " "
152. What is 'h<sub>i</sub>' for mirrors and lenses? height image
153. What is 'h<sub>o</sub>' for mirrors and lenses? " object
154. When is 'm' negative for mirrors and lenses? inverted
155. When is q negative for mirrors? behind mirror
156. If you are looking in a curved mirror and your image is always upright and smaller, what type of mirror is it? convex
157. What do you look like if you are close up to a concave mirror? magnified
158. What do things look like through a converging lens if you are further away than the focus? inverted, smaller
159. What do things look like through a diverging lens if you are further away than the focus? smaller upright
160. Which type of lens is thicker in the middle? converging
161. Which type of lens is thicker on the outside? diverging
162. Which type of lens has a negative focal length? diverging
163. When is 'q' negative for lenses? image + object - opposite sides of lens
164. If you are nearsighted, what is wrong with your eye? light rays cross before retina
165. Which type of lens is used to correct nearsightedness? diverging - spread out light
166. If you are farsighted, what is wrong with your eye? light rays cross behind retina
167. Which type of lens is used to correct farsightedness? converging
168. Why do lenses have a focal point on both sides of the lens? light goes through lens
169. If light is refracted by a lens, what does that mean? bent
170. What does a magnification of -0.5 mean? 50% smaller + inverted
171. What does a magnification of 10 mean? 10x bigger
172. Magnifying glasses and reading glasses are both types of which lens? converging