Name _____

Chapter 5 : Natural Laws & Car Control (p. 90 - 107)

I. Gravity & Energy Of Motion

1. **Gravity causes braking distance to :**

   Increase by going downhill Decrease by going uphill

2. **Define the term center of gravity.**

   Baseball Bat Example →

   Center Of Gravity - point around which an objects weight is evenly distributed

3. **A vehicle's stability ~~increases~~ decreases as its center of gravity rises.**

   Circle One : True (False)

   Chair Demo

4. **Define the term kinetic energy.**

   Kinetic Energy - energy of motion

   $KE = \frac{1}{2}mv^2$

5. **What happens to the kinetic energy of a vehicle if the :**

   mass is doubled : Doubled (2X stopping distance) speed is doubled : Squared (4X stopping distance)

II. Friction & Traction

1. **Define the term friction.**

   Friction - force created due to uneven surfaces

2. **Traction of tires makes it possible for vehicles to grip the road so you can :**

   Transparency Demo →

   Change speed or Change direction

3. **Why is tire tread an important consideration when purchasing new tires?**

   Tread cuts through water/snow to grip the road

4. **Worn out, bald tires can lead to** blowouts.

   Penny Test (Wear Bars)

5. **List three things that properly inflated tires enable a vehicle to optimize.**

   1. Control 2. Gas Mileage 3. Tire Wear

   TIRES:
   1. Size
   2. Tread
   3. Mileage Rating

6. **What are indicators of underinflated and overinflated tires?**

   Underinflation : Outside of tires worn quickly

   Overinflation : Center of tires worn quickly

7. **In order to maximize tire life on vehicles, it is important to rotate the tires regularly.**

   Circle One : (True) False

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8. Besides tires, what other traction control parts should be inspected regularly?

Shock Absorbers / Front-End Parts / Brakes

9. Where does water tend to freeze before on roads (which reduces traction)?

1. Bridges 2. Shaded Areas

10. What is a method used to test traction on roads during snowy, icy conditions?

Slow down and gently tap the brakes

11. Define the term inertia.

Newton's 1st Law of Motion

Inertia - tendency of an object to remain in motion or remain at rest

Rear view Mirror Dice

12. Which of the following statements is false concerning vehicle control in curves?

G.J. O'Bryant

a. Banked curves help ~~increase~~ decrease the effects of vehicular inertia on curves.
b. Adding weight to a vehicle will increase the effects of inertia.
c. Skidding is reduced my lowering your speed before entering a sharp curve.
d. The inertia of a vehicle on a curve will try to make the vehicle go straight.

III. Stopping Distance

1. What three things must happen when you attempt to stop a vehicle?

1. Perceive Hazard 2. React 3. Stop

2. Match each type of distance with the correct definitions.

Not the same!

1. B.	Braking Distance	A. Vehicle distance based on visibility, hazards, & ability
2. A.	Perception Distance	B. Distance based on time between braking & stopping
3. C.	Reaction Distance	C. Vehicle distance based on time to execute an action
4. D.	Total Stopping Distance	D. Distance your vehicle travels while you make a stop

3. A 4 -second rule can be used to predict stopping distance at any speed.

4. List six factors that increase braking distance.

1. Higher Speed 2. Worn Brakes 3. Weather Conditions
4. Impaired Driver 5. Driving Downhill 6. Heavy Loads

5. How do anti-lock braking systems (ABS) assist with controlling stopping?

Repititious series of applied brake pressure (Reduces impulse)

IV. Controlling Force Of Impact

1. Define the term force of impact.

Force Of Impact - force with which a moving object strikes another object

Impulse = F x Δt

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2. List three factors that determine the force of impact of another object.

1. Speed 2. Weight 3. Impulse (Distance/Time)

3. What are the three collisions that occur when a vehicle strikes a solid object?

1. Vehicle hits the object and stops
2. Occupants hit inside of vehicle or restraint device
3. Occupants may suffer organ impact

4. Give an example of a passive and active restraint device.

Passive Restraint : Air Bag Active Restraint : Safety Belt

5. How long does it take to secure a safety belt in a vehicle? A few seconds (DO IT!!!)

6. Which of the following statements is <u>false</u> concerning air bags?

ALL TRUE!

a. A driver must be positioned at least 10 inches from the steering wheel. (pedal extensions)
b. Air bags deploy at speeds over 200 mph.
c. To avoid injury to arms, head, or eyes, grip the steering wheels between 9 & 3 or 8 & 4.
d. Children under the age of 12 must sit in the back seat to avoid deployed air bag injury. (thumbs)

7. How have advanced air bags and air bag switches made air bags more effective?

Adjust speed + intensity

Advanced Air Bags : Sensors measure weight, seat position, severity

Air Bag Switches : Turn off passenger air bags (injury risk)

8. Match the following safety protection devices with the correct definitions.

1. F.	Automatic Safety Belts	A. Used in back seats for kids; Rear-facing
2. A.	Child Seat	B. Absorb impact at low speed without damage
3. I.	Crush Zones	C. Reduces object penetration on side panels
4. B.	Energy-Absorbing Bumpers	D. Compresses when vehicle hit; Reduces impulse
5. D.	Energy-Absorbing Steering Column	E. Cushions upper body impact in a collision
6. G.	Head Restraints	F. Shoulder belt drawn into place when door shut
7. E.	Padded Dash	G. Used to prevent whiplash
8. H.	Reinforced Windshield	H. Thin layer of plastic between glass layers
9. C.	Side Door Beams (Impact Panels)	I. Absorbs most collision force by crumpling