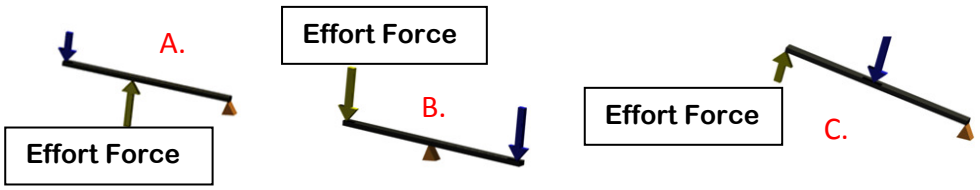
Name: _____ Date:_____ Period: _____

1.1 Mechanisms Test (30 pts)

Approximate all answers to hundredths place when needed. You must show all formulas, units and SHOW WORK!

Use the following Image for the first 3 Lever questions.



1. A. _____

B. _____

C. _____

1. **Name the type of lever for each of the above diagrams. (1 pt each)**

2. **Lever A uses an effort force of 30 lbs to overcome a resistance of 21 lbs. Find the actual mechanical advantage if the distance of the resistance force is 12 feet. (1 pt)**

2. _____

3. **Assume lever B has a 50lb resistance force and 15lb effort force. If the lever's effort force is located 4 ft from the fulcrum and it's resistance force is 1 foot from the fulcrum, what is the levers efficiency. (2 pts)**

3. _____

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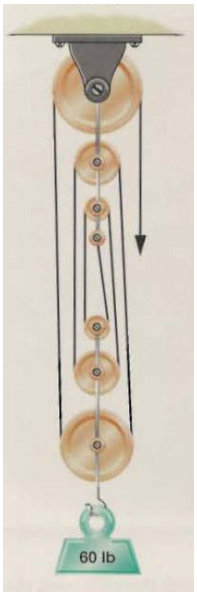
4. **An industrial water shutoff valve is designed to operate with a 25 lb effort force at the wheel. The valve will encounter 175 lb of resistance force applied to a 1.5 in. diameter axle. What is the actual mechanical advantage of the system? (1 pt)**

4. _____

5. What is the IMA of the Block and Tackle Pulley system to the right? (1 pt)



5. _____

6. If the efficiency of this Block and Tackle System is 85%. What is the Actual Mechanical Advantage of the system. (1 pt)

6. _____

7. Based on this Actual Mechanical Advantage How much effort force is needed to use this Pulley System to raise an object that weighs 320 lbs. (1 pt)

7. _____

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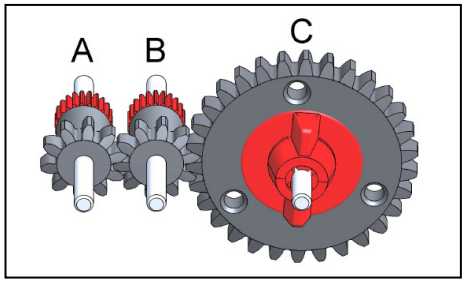
8. A wrench with a 1 1/2 inch handle is used to install a ¼ 20 UNC bolt into a robotic arm. What is the pitch of the screw? (1 pt)

8. _____

9. What is the ideal mechanical advantage of the above situation? (2 pts)

9. _____

10. In the simple gear train to the right, Gears A & B have 10 teeth, Gear C has 30. Using Gear A as the driver and C as the driven, what is the mechanical advantage of the system? (1 pt)



10. _____

11. Is this geared for gaining torque or speed? (1 pt) 11. _____

12. Gear B is an idler gear above, what is its unique purpose? (1 pt) 12. _____

_____

A gear train is (shown below) composed of four gears, A, B, C, and D. Gear A has 10 teeth and is meshed with gear B. Gear B has 20 teeth and shares a shaft with gear C, which has 16 teeth. Gear C is meshed with gear D, the output gear which has 40 teeth.

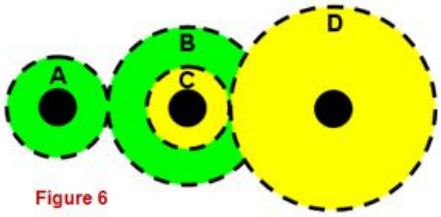


Figure 6

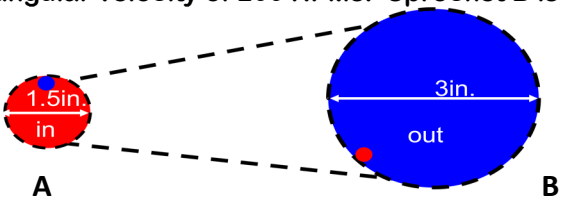
13. Find the gear ratio of the gear train (1 pt)

13. _____

14. Describe why this is known as a compound gear train. (1 pt) 14. _____

_____

The following diagram represents a chain and sprocket system. Sprocket A is the driving sprocket and has a angular velocity of 200 RPMs. Sprocket B is the driven sprocket and has a torque output of 353 inch · lbs.



15. Calculate the torque of sprocket A. (1 pt.)

15. _____

16. Calculate the angular velocity of gear B. (1pt.)

16. _____