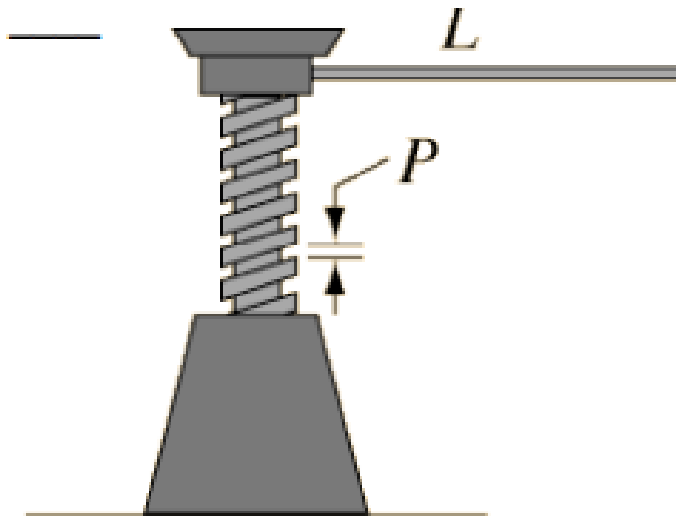1. When was the hand axe invented?
2. Where was the waterwheel invented?
3. When and where was the rudder invented?
4. Who invented the water clock?

5. What is this, and what is it used for?

6. What is the formula for IMA of a screw?

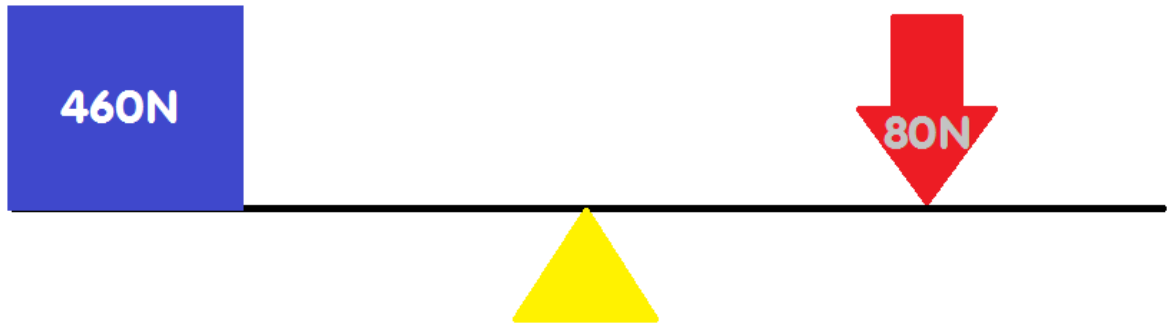7. What is the IMA of this screw?

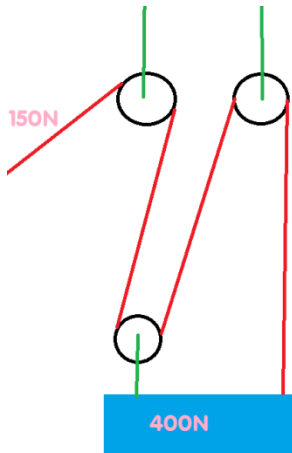**L= 7 cm**

P= 20 mm

8. Who invented the compound pulley?

9. What is the IMA of this machine?

460N   80N

10. What is the efficiency for the machines below?
A. Efficiency:_____   B. Efficiency:_____

150N

400N

120N   94N

30cm

.

11. Identify the types of gears:

a. _____

b. _____

c. _____

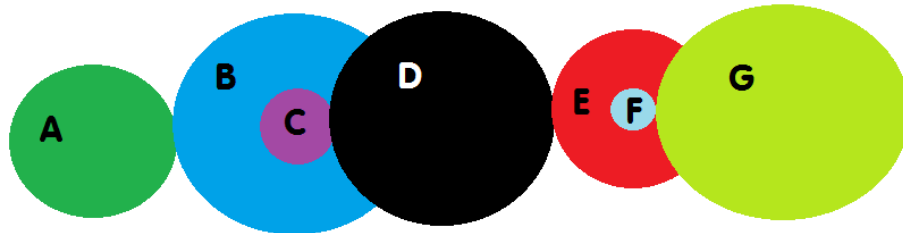d. _____

12. Newton's Laws

#1._____

_____

#2_____

_____

#3_____

_____

13. What is the ratio for this train?

A is the driver

A=30T E=30T
B=40T F=8T
C=10T G=50T
D=35T

14. Write down the SI unit for each term:

Force:_____
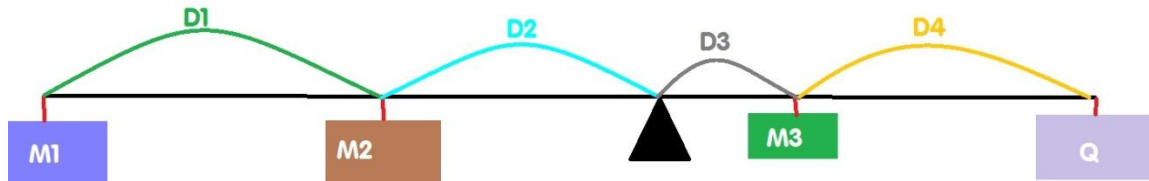
Distance:_____

Energy:_____

Work:_____

Power:_____

Torque:_____

15. Write the equation to get AMA from efficiency and IMA.

16. What are the 2 equations for efficiency?

_____   _____

17.Do!

What weight, Q, is required to balance the lever shown below (not drawn to scale):

If:
D1=20.0cm M1=50.2kg
D2=5.0cm   M2=44.2kg
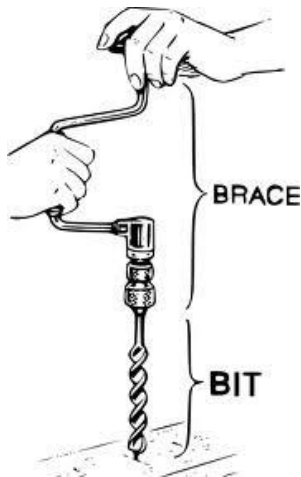D3=7.28cm M3=100.0 kg
D4=2.22cm

Q=_____

18.Identify the type of simple machines. List all simple machines in picture. If lever, identify the class (1st,2nd,or 3rd).

a._____   b._____
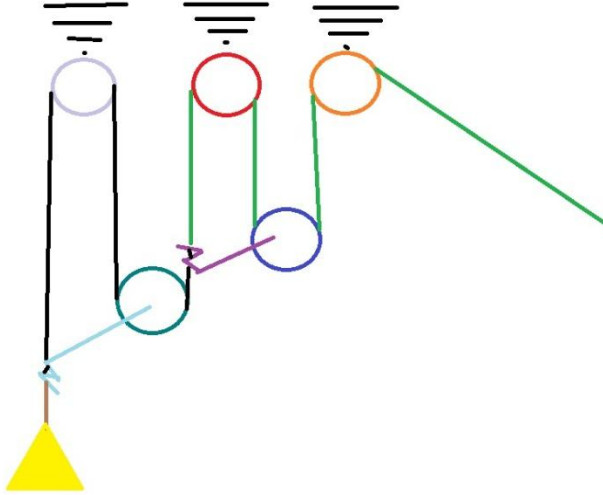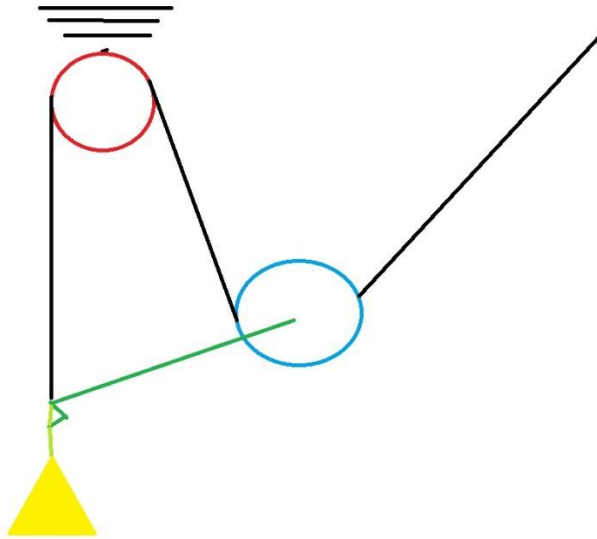

c._____   d._____

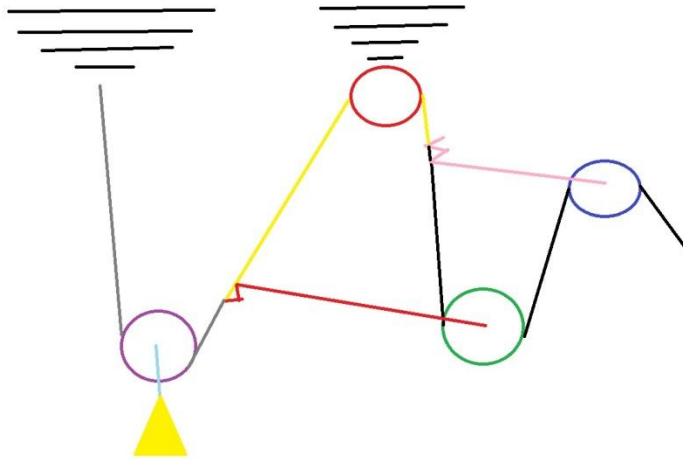19. Write down IMA in blank:

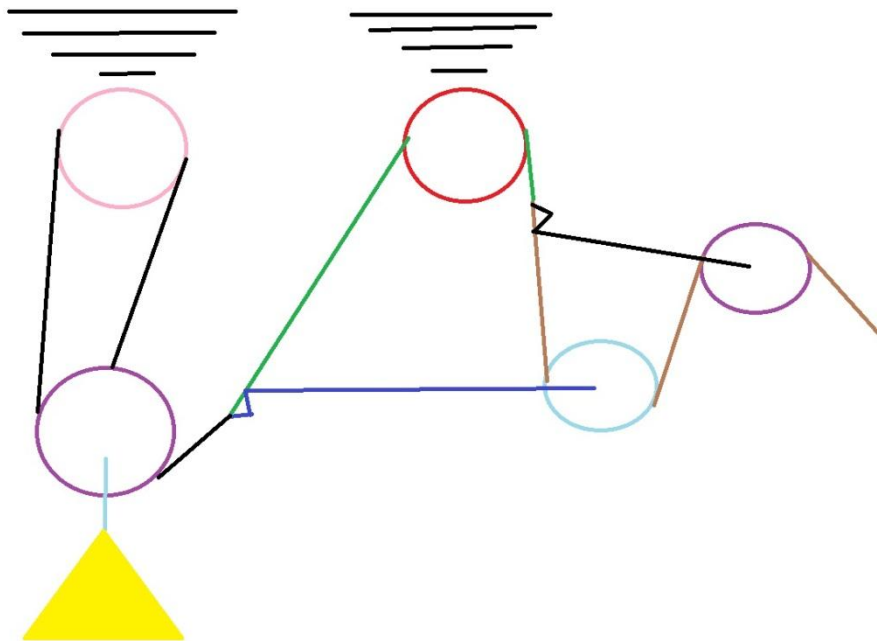

a._____

b._____

c._____

d._____

20.Where, when, and who invented the chainsaw?

21. What was invented in America, by William Schopp, in 1932?

22. Where was the slingshot inveted?

23. Who invented the lever?

24. Who invented the pulley?

25. Who invented the wheel and axle?

26. Who invented the screw?

27. What is the "Law of Conservation of Energy"?

_____

_____

28. What is the formula for a watt?

29. How can you find out how many teeth the ring gear on a planetary gear has without counting?

30. Circle one:

a. With gears, Smaller driver means IMA (<,>) 1.

b. A joule = $\left(Ncm, (kg*m^2)/(sec^2)\right)$

c. 1 kg=9.81N, SO 1N= (1.02kg, 0.102kg)

KEY

1. 1800000 BC

2. Greece

3. In China, 1200

4. Su Sung

5. Antikythera mechanism (Greek)/Predicted positions of heavenly bodies

6. (pi*diam)/lead   (lead often=pitch)

7. IMA=21.99   (pi*14)/2

8. Archimedes (or Obama)

9. Unable to get IMA, AMA is 5.75

10. A. IMA=3 AMA=2.6 Eff=86.8% B. IMA=1.28 AMA= 1.28 Eff= 100%

11. A. Herringbone Gear   B. Planetary Gear   C. Helical Gear   D. Sector Gear

12. #1.Law of Inertia: An object in motion (or rest) stay in motion (or at rest) until acted on by another force.

    #2 Law of Motion: Acceleration is produced when a force acts on a mass.

    #3 Law of Force Pairs: For every action there is an equal and opposite reaction.

13. 25:1

14. Newton, meter, joule, joule, watt, newton-meters

15. AMA= Efficiency*IMA

16. W_{out}/W_{in} and   AMA/IMA*100

17. Q=772.44N or 78.74kg (half points)

18. A. 1st class lever, wedge   b. 2nd class lever, NO wheel and axle (roller instead)

    c. Wheel and axle, screw   d. Wheel and axle, gear

19. A. 9   b. 3   c.10   d.15

20. Germany, 1927, and Emil Lerp

21. Toilet Brush

22. Egypt

23. Archimedes

24. Archimedes

25. Not sure, 1st found in Slovenia

26. Nebuchadnezzar II

27. The amount of work output from a machine is never more than the work input.

28. j/sec

29. R=2P+S (gear teeth)

30. a. >   b. $(kg*m^2)/(sec^2)$ c. 0.102kg