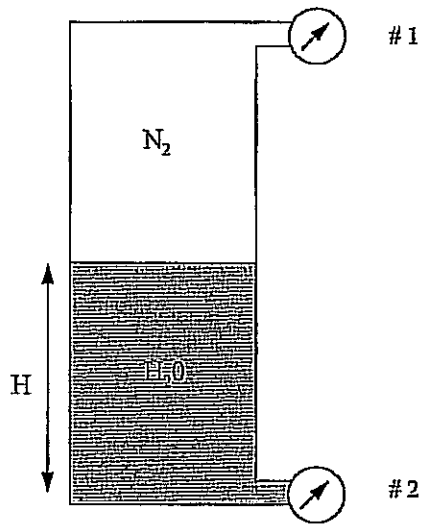


Section III: Mechanical



1. For the tank shown above what is the pressure in psi measured at gauge #2 if the pressure at gauge #1 is 300 psi (21 kg/cm^2) and the level of the water (H) is 70 ft (21.4 m).

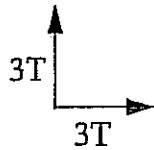
- A. 315 psi B. 23 kg/cm^2 C. 330 psi D. 300 psi

2. Indicate the resultant force, magnitude, and direction:



- A. $\leftarrow 7T$ B. $\rightarrow 7T$ C. $17T \rightarrow$ D. $\leftarrow 17T$

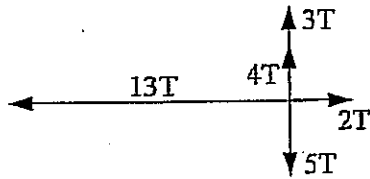
3. Indicate the resultant force, magnitude and direction:



- A. $4.24 T$ B. $9 T$ C. $4.24 T$ D. $9 T$



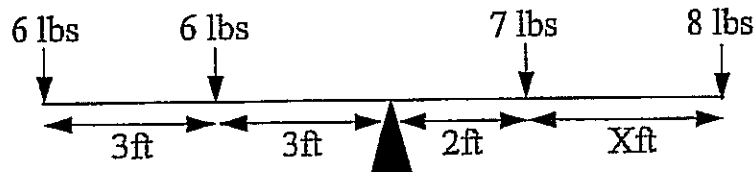
4. Indicate the resultant force, magnitude and direction:



- A. $27 T$ B. $11.18 T$ C. $13.28 T$ D. $6.22 T$

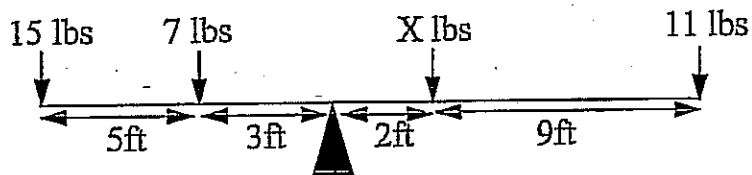


5. For the system shown below, what should the distance X be for the system to be in equilibrium?



- A. 2.75 ft B. 3.0 ft C. 3.25 ft D. 2.5 ft

6. For the system shown below, what force should be applied at X for the system to be in equilibrium?



- A. 8 lbs B. 9 lbs C. 10 lbs D. 11 lbs

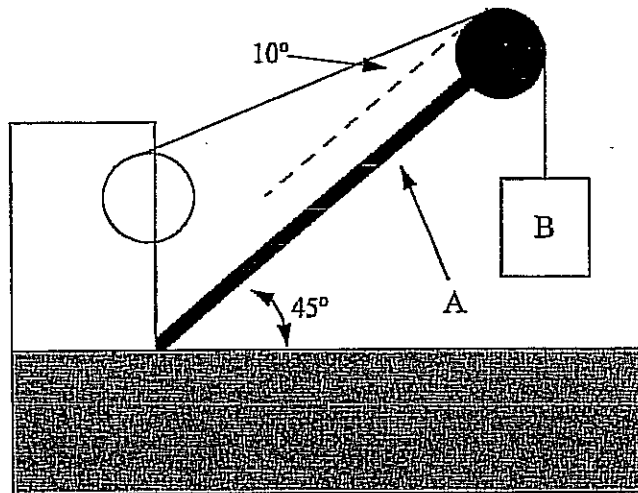
7. For any given lever, the shorter the lever, the greater the lifting power.

- A. True B. False

8. A body is floating in seawater with 2/3 of its volume above the surface. The weight of the displaced water is?

- A. Less than the weight of the body
- B. Equal to the weight of the body
- C. More than the weight of the body
- D. Not enough information provided

9. Consider the crane lifting the load shown. If the maximum crane loading on member A is 40,000 lbs (18,140 kg) as a bending limit, calculate the heaviest load that can be lifted.



$$\cos 45 = .707$$

$$\sin 45 = .707$$

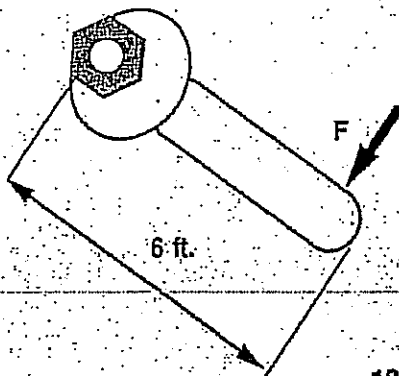
$$\cos 10 = .985$$

$$\sin 10 = .174$$

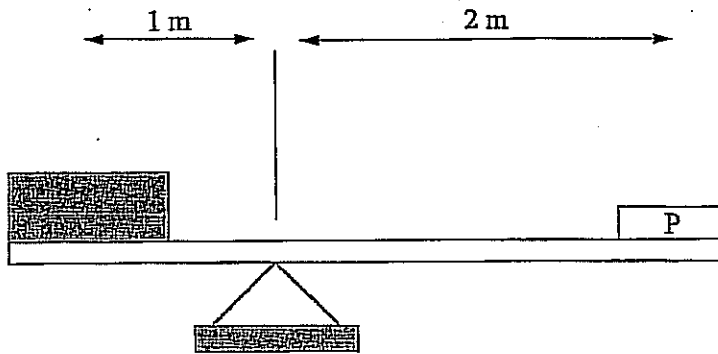
- A. 34,112 lbs
- B. 75,046 lbs
- C. 49,140 lbs
- D. 28,280 lbs

10. What is the value of F if the torque is 50 lbs/ft?

- A. 100 lbs
- B. 300 lbs
- C. 8.33 lbs
- D. 25 lbs



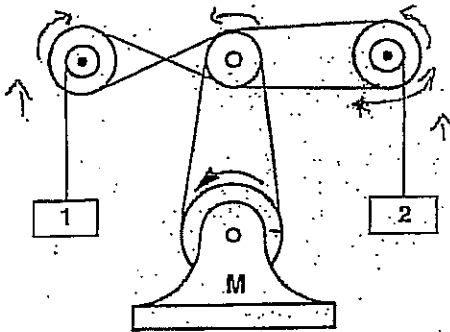
11. For the system to be in equilibrium, what is the mass of P in pounds? The mass at the other end of the beam is 5 kg.



- A. 5.5 lb B. 2.8 kg C. 10 kg D. none of these

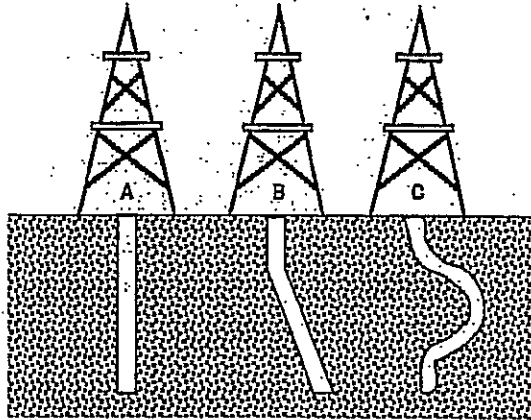
12. If the motor M rotates in the direction shown by the arrow, what is going on ?

- A. 1 and 2 are going down
- B. 1 goes up and 2 goes down
- C. 1 and 2 are going up
- D. 1 goes down and 2 goes up



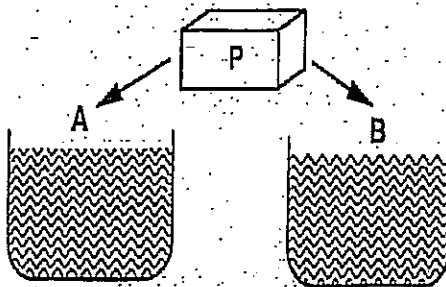
13. These 3 wells have been drilled with a mud of specific gravity of 1.25 gr/cm^3 . In which well A, B or C, will the highest hydrostatic bottom hole pressure be recorded ?

- a. Well A
- b. Well B
- c. Well C
- D. All three will have equal bottom hole pressure



14. If the density of A is greater than the density of B. What is going to happen ?

- A. If P floats in liquid A, it will also float in B.
- B. If P floats in liquid B, it may or may not float in A, depending on the density of P.
- C. If P sinks in B, it will sink in A also.
- D. None of the above answers are correct.



15. The bevel gear A has 70 teeth, bevel gear B 140, C 114, and D 456. The diameter of the pulley E = $\frac{1}{2}$ diameter of pulley F. At what speed in RPM must rotate the motor M to allow the hammer to knock anvil X twice per second, taking into consideration the gear box R whose ratio inlet/ outlet is 5/1?

- A. 2400
- B. 1920
- C. 7200
- D. 9600

