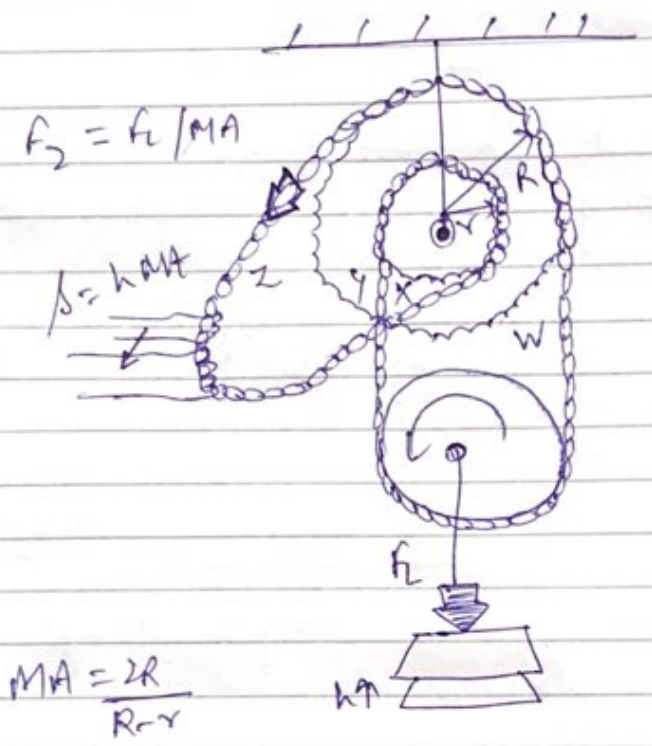
Answer-4 :-

Working principle of weston Differential pulley

Operated by pulling upon the slack section of a continuous chain that wraps around pulleys. The relative size of a two connected pulley determines the max^m weight that can be lifted by hand. If the pulley radii are close enough the load will remain in place (and not lower



Differential Pulley

under the force of gravity) until the chain is pulled.

→ The 2 sections of chain carrying the single pulley exert opposing and unequal torques on the connected pulleys, such that only the difference of these torques has to be compensated manually by pulling the loose part of the chain.

→ This leads to a Mechanical Advantage:- the force needed to lift a load is only a fractions of the loads weight, At same time, the distance the load is lifted is smaller than the length of chain pulled by same factor. This M.A. depends on relative difference of Radii r & R of

the Connected pulleys:-

$$MA = \frac{2R}{R-r} = \frac{2}{1-\frac{r}{R}}$$

Effect of F & distance is Quantitatively:-

$$F_2 = \frac{F_L}{MA}, \quad h = \frac{s}{MA}.$$