Key

Ch 10 Review Questions

1. A 10.0 N box is raised from the ground 3.2 m. How much work is done?

$W = Fd$

$= 10.0N\,(3.2m)$

$32J$

2. An ideal machine is used to lift an 20.0 N weight a distance of 7.3m. A force of 12. 0 N is used. How far does the effort force move? Remember that an ideal machine, the work output equals the work input.

$F_e d_e = F_r d_r$

$\frac{(12.0N)\,d_e}{12} = \frac{(20.0N)(7.3m)}{12}$

$d_e = 12.2\ m$

3. An effort force of 300.0 N is applied to an ideal machine. The effort force moves an 780.0 N object a distance pof 240.0 cm. What is the mechanical advantage of the machine?

$MA = \frac{F_r}{F_e}$

$= \frac{780.0N}{300.0N}$ $\quad MA = 2.6$

4. How much power is developed by a machine that moves a 480.0 N load 26 m in 15 s?

$P = \frac{W}{t}$

$= \frac{480.0N(26m)}{15s}$ $\quad P = 832\ W$

5. A machine requires a work input of 185 J to complete a job that uses 145 J. What is the efficiency of the machine?

$\frac{W_{out}}{W_{in}} \times 100\%$ $\quad \frac{145J}{185J} \times 100\%$ $\quad 78.4\%$

6. A machine lifts a 278 kg object 110 m in 37 s. Find the power.

$$P = \frac{W}{t}$$

$$= \frac{278\,kg(9.8)(110\,m)}{37\,s}$$

$$P = 8099.6\,W$$

7. A box is pulled with a rope at an angle of 27o above the horizontal. The force is 57.0 N for a distance of 275 m. How much work is done?

$$W = Fd\cos\theta$$

$$= (57.0\,N)(275\,m)(\cos 27^\circ)$$

$$= 13,966.5\,J$$

8. At what speed can a 150.0 W crane lift a 2500.0 N load?

$$P = \frac{Fd}{t}$$

$$150.0\,W = 2500\,N\left(\frac{d}{t}\right)$$

$$0.06\,m/s$$

9 Do the following questions on p 278 in textbook.

35, 38-42, 44-46, 48-49.

Review Questions

35 - J

38 - $W = Fd$ $\quad P = \frac{W}{t}$

39 $Kg \cdot m^2/s^3$

40. No -

41 - levers - wheel & axle

42 same $\quad 420(200) = 210(400)$

$84{,}000 = 84{,}000$

44 - Net work is zero → positive work ↙ Negative work so they cancel each other out. Paid by time & NOT the amount of work

45 (Force is ↑, motion is → so no work done on box. perpendicular to each other

46. a) Both - same Amt of work

b) 25 s person more powerful

48. Increase ratio of $\frac{d_e}{d_r}$ distance

49. Reduce Friction - oil.