Work energy and power.

$$W = F \times d$$
$$F = m \times g$$
$$P = \frac{W}{t}$$
$$KE = \frac{1}{2} mv^2$$
$$PE = mgh$$

Revision.

1. → The energy possessed by a body resting at a certain height due to its position or configuration is called as potential energy.

→ Soln

Here,

(m) Mass = 80 kg

(h) Height = 900 m

(t) time = 30 m. = 60×30

$$= 1800 \, s.$$

Now,

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

$$= \frac{F \times S}{t} \quad [\because W = F \times S]$$

$$= \frac{m \times g \times h}{t} \quad \left[\begin{array}{l} \because F = mg \text{ and} \\ S = h \end{array}\right]$$

$$= \frac{\overset{40}{\cancel{80}} \times 10 \times \cancel{9} \overset{}{\cancel{00}}}{\underset{21}{\cancel{318} \cancel{00}}}$$

$$= 400 \text{ watt.}$$

$\therefore$ The man's power is 400 watt.

2. → Transformation of energy is the process of in which one form of energy is converted into another form.

→ Soln,

Here,

Load (F) ~~weight~~ = 175N

Height (h) = 25m

time [t] = 100s.

Now,

$$P = \frac{w}{t} = \frac{F \times S}{t}$$

$$= \frac{F \times S}{t} \quad \left[\because w = F \times S\right]$$

$$= \frac{F \times h}{t} \quad \left[\because S = h\right]$$

$$= \frac{175 \times 25'}{100 \, 4,}$$

$$= 43.75 \text{ watt.}$$

∴ The power th of the man is 43.75 watt.

3. → Sol^n,

Here,

(P) Power = 10 H.P

$$= 10 \times 746 \text{ watt}$$

$$= 7460 \text{ watt.}$$

Mass (m) = 37.3 kg

distance (s) = 2km = 2θ × 1000 m

$$= 2000m$$

Now,

4,
175
41

1 hp : 746
10 Hp =

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

or, $P = \frac{F \times S}{t}$ $[\because w = f \times s]$

or, $P = \frac{m \times g \times S}{t}$ $[\because F = m \times g]$

or, $7460 = \frac{37.3 \times 9.8 \times 2000}{t}$

or, $7460t = 3731080$

or, $t = \frac{731080}{7460}$

$\therefore t = 98s$.

$\therefore$ The time taken will be 98 seconds

4. →

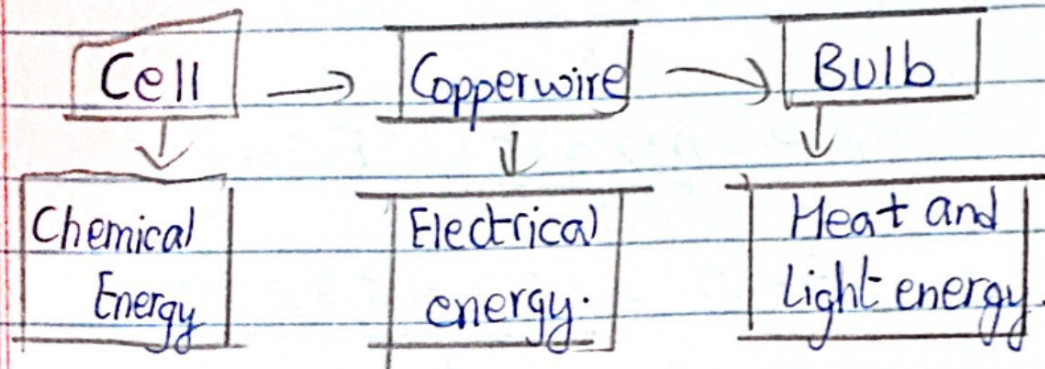| Kinetic Energy	Potential Energy.
- It is the energy possessed by a body by a virtue of its motion.	- It is the Energy possessed by virtue of its position.
- It is calculated by $KE = \frac{1}{2}mv^2$.	- It is calculated by $PE = mgh$.

→ Transformation of energy when a bulb is lighted from a cell.

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┌──────┐      ┌───────────┐      ┌──────┐
│ Cell │  →   │ Copperwire│  →   │ Bulb │
└──────┘      └───────────┘      └──────┘
   ↓                ↓                ↓
┌──────────┐   ┌──────────┐   ┌────────────┐
│ Chemical │   │ Electrical│  │  Heat and  │
│  Energy  │   │  energy.  │  │Light energy.│
└──────────┘   └──────────┘   └────────────┘
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5.

→ 1 joule work is # said to be done when 1N force covers a distance of 1 metre.

→ Application of electrical energy is to turn on light bulb from a switch, turning on a fan from switd switch from electricity, using motor to pump water from well.

6. → One watt power is said to be done when 1 joule work is done in 1 second.

ⓐ → Potential energy.
ⓑ → Kinetic energy.
ⓒ → Heat and light energy

Work	Power
→ It is the product of force and displacement in direction of force.	→ It is the rate of doing work.
- Its SI unit is joule(J).	- Its SI unit is watt (W).

7.

→ Soln,
   Here,
      Load (F) = 12000 N
      Height (2h) = 20m
      time (t) = 30s.

   we know,

$$P = \frac{w}{t} = \frac{F \times h}{t} = \frac{\cancel{12000}^{4000} \times 20}{\cancel{30}^{1}}$$

$$= 8000 W$$

∴ Power of the crane = 8000W = $\frac{8000}{746}$ ~~HP.~~

$$= \cancel{10.7 \, HP} \cancel{\#}$$

8. → Principle of Conservation of energy is, " Energy can neither be created nor be destroyed but it can be changed from one form to another".

→ Soln,

Here,

Total bricks = 20

Weight of each brick = 10N

Total weight of the bricks (F) = 20×10 N
$$= 200N$$

distance $(s) = 100m$

time $(t) = 50s$.

We know,

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

$$= \frac{F \times s}{t} \quad [\because W = f \times s]$$

$$= \frac{200 \times \overset{2}{100}}{150}$$

$$= 400 \, W.$$

∴ The ~~time tak~~ power of the porter is 400 watt.