Answers to worksheet 13

Ans1. Weight of bucket and water = 6 x 10

= 60N

i.e Load = 60N

Effort = 70N

M.A. = Load / Effort = 60N / 70N = 0.857

Ans2. Mass = 100 kg

Weight = 100 x 10

= 1000N [since force of gravity on 1kg is 10N]

Workdone = 1000N x 8m

= 8000J

i) Power input = workdone / time

= 8000J / 4s
Effort = 1000N
Load = 75kgf = 750N

\[ M.A = \frac{L}{E} = \frac{750}{1000} = \frac{3}{4} = 0.75 \]

V.R = 1 [single fixed pulley]

Therefore, Efficiency = \[ \frac{M.A.}{V.R} \times 100 \]
\[ = 0.75/1 \times 100 \]
\[ = 75\% \]

**Ans3.** In single fixed pulley.

**M.A.** = 1 = \[ \frac{L}{E_1} = \frac{50}{E_1} \]

In single movable pulley

**M.A** = 2 = \[ \frac{L}{E_2} = \frac{50}{E_2} \]

ATP, \[ \frac{1}{2} = \frac{50}{E_1}/\frac{50}{E_2} \]

Or \[ \frac{1}{2} = \frac{E_2}{E_1} \]

Or \[ \frac{E_1}{E_2} = \frac{2}{1} = 2:1 \]

**Ans4.** i) \[ M.A = \frac{L}{E} = \frac{75}{25} = 3 \]

ii) \[ V.R = 3 \]
iii) Efficiency = \( \frac{M.A}{V.R} = \frac{3}{3} = 1 \) = 100%

**Ans5.**

Load = 150N

Effort = 60N

M.A. = \( \frac{L}{E} = \frac{150}{60} = 2.5 \)

**Answers to worksheet 14.**

**Ans1.** When the medium particles vibrate, there is a change of kinetic energy into potential energy and vice-versa. This is known as mechanical waves.

**Ans2.**

a) **Wavelength** - The distance travelled by a wave in one time period of vibration of the particle of the medium.

b) **Frequency** – The number of vibrations made by the particle of the medium in one second.
c) **Amplitude**- The maximum displacement of the particle of the medium on either side of its mean position.

d) **Wave velocity**- The distance travelled by the waves in one second.

**Ans3.** i) Wavelength  ii) Frequency

**Ans4.** Two factors are:

i) Elasticity and  ii) Density

**Ans5.** **Light waves**

i) These are electromagnetic waves.

ii) They can travel in vacuum.

**Sound waves**

i) These are mechanical waves.

ii) They require a medium for propagation.

**Ans6.** The return of sound waves on striking a surface such as wall, metal sheet etc. back in the same medium is called the reflection of sound waves.

One condition is the size of the reflecting surface must be bigger than the wave length of the sound wave. E.g megaphone.

**Answers to worksheet 15**

**Ans1.** To applications are:

i) SONAR
ii) In medical field

**Ans2.** The sound produced by the flying bats gets reflected back from an obstacle in front of it. By leaving the echo, bats come to know, even in dark the location of the obstacle.

**Ans3.** Let the distance be ‘d’

\[ V = 350 \text{ms}^{-1} \]

\[ d = \frac{V t}{2} = 350 \times \frac{0.1}{2} = 17.5 \text{m} \]

**Ans4.** Let the distance be ‘d’

\[ V = 1400 \text{ms}^{-1} \]

\[ d = \frac{V t}{2} \]

\[ = 1400 \times \frac{0.1}{2} = 140/2 = 70 \text{m} \]

**Ans5.** Time gap = 4/2s = 2s

Let the distance be d

\[ D = \frac{V t}{2} = 1400 \times 2 = 2800\text{m} = 2.8\text{km}. \]