

## PHYSICS EXERCISES FOR S2(ALL)

### 8.4 EXERCISES

1. Define the joule. If a force of **5N** moves through a distance of **2m**, how much work does it do? How much energy does it transfer?
2. a. Define the term power and give its SI unit.  
b. A motor raises a block of mass **72kg** through a vertical height of **2.5m** in **28 seconds**. ( $g=10\text{m/s}^2$ )
  - i. Work done on the block.
  - ii. Useful power supplied by the motor.
3. a) Define work and state its SI unit.  
b) Which quantity has the same unit as work?  
c) An engine force of **5000N** pulls a car **100m**. Find the work done by the engine.
4. A man lifts a weight of **300N** through a vertical height of **5m in 10 seconds**. Determine ;
  - a. The work done.
  - b. The man's power
5. Calculate the power of a pump which can lift **300kg** of water through a vertical height of **8m in 10 seconds**. ( $g=10\text{m/s}^2$ ).
6. A cyclist is speeding along at **16m/s**. If the mass of the cyclist together with his bicycle is **80kg**. What is his kinetic energy?
7. A boy whose weight is **600N** runs up a flight of stairs **10m** high in a time of **12 seconds**. What is his average power?
8. How far must a **5N** force pull a **50g** toy car if **30J** of energy are transferred?
9. A football of mass **2.5kg** is lifted up to the top of a cliff that is 180m high. How much potential energy does the football gain? (**Use  $g=10\text{m/s}^2$** )
10. A person of mass **70kg** runs up a flight of stairs with a vertical height of 5m. If the trip takes **7 seconds** complete. (**Use  $g=10\text{m/s}^2$** ).
  - a. Calculate the minimum upward force.
  - b. How much work is done?
  - c. What is his potential energy?
  - d. Calculate the person's power.

11. A lift motor has to move a fully laden lift **4m** between floors in **1.5 seconds**. The lift has a mass of **1850kg** (ignore friction). **(Use  $g=10\text{m/s}^2$ )**.
- Calculate the weight of the fully laden lift.
  - What is the upward force in the cable when the lift is moving at a constant speed?
  - What is the work done by the motor?
  - What is the minimum power of the motor to raise the lift at a steady speed?
12. How fast is **4kg** trolley moving if it has **180.5J** of kinetic energy?
13. A spring when suspended with a mass of **500g** its length increases by **5cm**. Determine its constant and potential energy. **( $g=10\text{m/s}^2$ )**
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