

IFAK-KIMIHURURA

SUBJECT: PHYSICS

CLASS: S1 ALL

## EXERCISES (UNIT6: WORK; ENERGY AND POWER)

1. Explain the following terms:
    - a. Work;
    - b. Energy;
    - c. Power.
  
  2. Calculate the work done by a force of **30N** in lifting a load of **2kg** to a height of **10m**.
  3.
    - a. What is meant by a source of energy?
    - b. Give three examples of sources of energy used in Rwanda.
  4. How much work is done when a cumulative force of **1080N** is used to push the car **218m** to the nearest fuel station?
  5. During the powerhouse lab; Jerome runs up the stairs; elevating his **102kg** body a vertical distance **3m** in a time of **1.32 seconds** at a constant speed. ( $g=9.8m/s^2$ )
    - a. Determine the work done by Jerome in climbing the stair case.
    - b. Determine the power generated by
  6. A **78kg** skydiver has a speed of **62m/s** at an altitude of **870m** above the ground. ( $g=10m/s^2$ ).
    - a. Determine the kinetic energy possessed by the skydiver.
    - b. Determine the potential energy possessed by the skydiver.
    - c. Determine the total mechanical energy possessed by the skydiver.
  7. Kalisa ( $m=56.2kg$ ) is travelling at a speed of **12.8m/s** at the top of a **19.5m** high roller coaster loop. ( $g=10m/s^2$ ).
    - a. Determine kalisa's kinetic energy.
    - b. Determine kalisa's potential energy at the top of the loop.
  8. Who has more kinetic energy; a boy of **50kg** running at **5m/s**? Show all your work.
  9. An orange of **200g** falls from a tree of height **10m** to the ground. ( $g=10m/s^2$ )
    - a. State the energy changes that will occur as the orange hits the ground.
    - b. Calculate the potential energy of the orange before it falls off.
    - c. Calculate the kinetic energy of the orange when it hits the ground.
  10. A crate of mass **50kg** is pushed along a floor with a force of **20N** for a distance of **5m** in **10seconds** ( $g=9.8m/s^2$ )
    - a. Calculate the work done.
    - b. Determine the power developed in **10 seconds**.
  11. How far must a **5N** force pull a **50g** toy car if **30J** of energy are transferred?
  12. A person of mass **70kg** runs up a flight of stair with a vertical height of **5m**. ( $g=10m/s^2$ ). If the trip takes **7 seconds** to complete; calculate the person's power.
  13. A lift motor has to move fully laden lift **4m** between floors in **1.5s**. The lift has a mass of **1850kg**. (use  $g=10m/s^2$ ).
    - a. Calculate the weight of the fully laden lift.
    - b. What is the upward force in the cable when the lift is moving at a constant speed?
    - c. What is the work done by the motor?
    - d. What is the minimum power of the motor to raise the lift at a steady speed?
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