Wednesday, May 29/13
Physics 112/111

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1. ICA: Power, Efficiency and Energy Conservation
   (Still to Be Returned)

2. Exam Outline: Topics - C6 and C7

3. Worksheet - Wave Equation and More -> HW P4

4. Wave Behaviours - Reflection, Refraction...

   HW 2 - Be prepared to complete diagrams for
   refraction cases #1, 2 and 3 tomorrow.

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# Exam: Outline - Chapter 6 and Chapter 7

- work (scalar quantity)

- three cases when work is not done

- positive and negative work

- energy (scalar quantity)

- types of energy: kinetic and potential (gravitational and elastic)
  - kinetic → motion
  - gravitational → position (reference level required)
  - elastic → condition

- work-kinetic energy theorem

- work-gravitational potential energy theorem

- Hooke's Law - applied force and restoring force
  - compression and extension
  - spring constant
  - elastic limit

- power (scalar quantity)

- efficiency

- conservation of energy: $E_{ki} + E_{gi} + E_{ei} = E_{kf} + E_{gf} + E_{ef}$

# Exam: Outline - Chapter 4 and Chapter 5

- force (vector quantity)

- five examples: gravitational force (weight), applied, normal, force of friction (static and kinetic), tension

- coefficient of friction (static and kinetic) $\mu$ - no unit
  $\mu < 1$

- contact/non-contact forces

- FBDs (free body diagram)

- state of equilibrium ($F_{net}$ = 0 N, **v** = 0 m/s or **v** is uniform)

- Newton's Three Laws of Motion
  1st: $\mathbf{F}_{\mathbf{net}}$ = 0 N (Chapter 4) (Law of Inertia)
  2nd: $\mathbf{F}_{\mathbf{net}}$ = m**a** (Chapter 5)

  * May need kinematic equations in C5. ← Review labs

  3rd: For every action there is an equal but opposite reaction.

- Atwood's Machine and Fletcher's Trolley ← L1

- momentum (vector quantity) $\vec{p}$

- impulse (vector quantity) $\vec{J}$

- impulse/momentum theorem $\vec{J} = \Delta\vec{p}$

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~ 4 problems

C4
C5 → 0
   → 1
$\vec{J} = \Delta\vec{p}$

# Exam: Outline - Chapter 2 and Chapter 3

1. physics mc.
2. kinematics/dynamics mc
3. frames of reference: fixed/moving mc
4. scalar quantity - magnitude only mc
5. conventional directions prob.
6. vector quantity - magnitude and direction mc
7. examples of scalar and vector quantities mc
8. graphical ~~addition~~ of vectors: tip-to-tail/parallelogram method mC
9. analytical ~~addition~~ of vectors
10. Level 1 - subtracting vectors
    - perpendicular components } mc
11. vocabulary: distance, position, displacement, time, speed, velocity, acceleration, etc. mC
12. symbols and units of physical quantities mC
13. types of motion: uniform/uniformly accelerated mC
14. ~~position~~-time graphs
15. velocity-time graphs mC   slope ⇒ acc.   area ⇒ displ.
16. relationship between directions of velocity and acceleration

    $\vec{v}$ +ve, $\vec{a}$ -ve } slows down.   $\vec{v}$ -ve, $\vec{a}$ -ve } speeds up.

17. checklist for word problems prob.
18. motion equations ~~including derivations~~ prob.
19. acceleration due to gravity prob.
20. freely falling bodies prob.

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Problems: kinematic equations
× freely falling body.

~2 prob