Thursday, May 30/13
Physics 112/111

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1. Return -> ICA: Power, Efficiency and Energy Conservation
2. Check: Worksheet - Wave Equation and More -> P4
3. Refraction Cases: #1, 2, 3
4. Wave Behaviours - Refraction (Continue)

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
  - potential: position (reference level required), 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) μ - 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: $\mathbf{F_{net}} = 0$ N (Chapter 4) (Law of Inertia)
  - 2nd: $\mathbf{F_{net}} = m\mathbf{a}$ (Chapter 5)

    * May need kinematic equations in C5. Review this by

  - 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 $\vec{J} = \Delta\vec{p}$

~ 4 problems

C4

C5 → 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, mc
    speed, velocity, acceleration, etc.
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 .

Problems : kinematic equations
* freely falling body.

[~2 prob]