Justin/Aaron

10. $\Delta U = \frac{3}{2}\Delta(PV)$

$\Delta(PV) = 0 = \Delta U$

they could have asked a to b, etc.

19. if there is no electric field, there can be no potential difference.

they could have asked for electric field.

37. $A_1\vec{V}_1 = A_2\vec{V}_2$

use diameter (it's not the area) to find πr^2.

they could have done something Bernoulli-related.

48. $\frac{PV}{T} = \frac{PV}{T}$

$\rho = \frac{M}{V}$

$\rho = kn$

$n = \frac{c}{v}$

$v = f\lambda$

they could have asked for anything along the way

49. flip it.

they have asked lens equation stuff

50. $\sqrt{\frac{F_T}{\mu}}$

they could have given us values.

52. $Q = CV$

$U = QV = \frac{1}{2}CV^2$

they could have used values or a circuit.

54. conservation of momentum

$KE = \frac{1}{2}mv^2$

they could have had two skaters collide.

58. $B = \frac{\mu_0}{2\pi} \frac{I}{r}$

using sensor and meterstick we get B and r.

for E, voltmeter is unnecessary.

they could have switched things around or given us a diagram.

62. When an electron moves to a less excited state, it releases stored energy as a photon. It moves up when it gains energy to store. Electrons are part of the atom.

they could have given us a diagram.

63. definition.

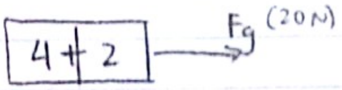
they could have asked for experiments that demonstrate each property

65. C and D just don't work.

A and B have messed-up angles of refraction.

E has the only possible drawing.

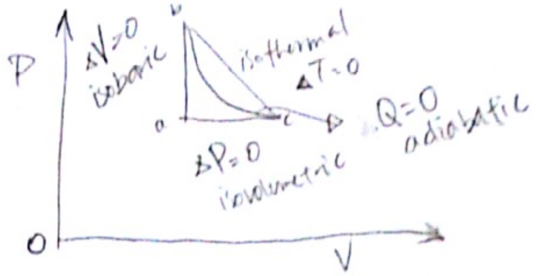
69.



$F = ma$

they could have introduced friction or changed what we're looking for.

10.

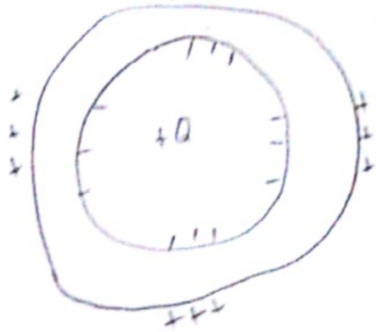


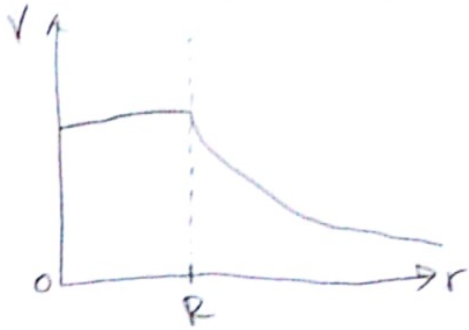
$\Delta U = W_{on} + Q = 0$

$Q_{bc} = -W_{on}$

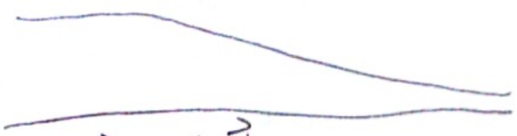
$\Delta U_{ab} = Q \quad \Delta U_{ca} = Q + W_{on}$

19.





37



$A\vec{V} = A_1\vec{V}_1$

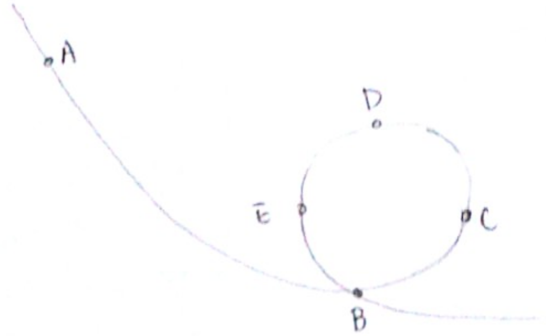
$A = \pi r^2$

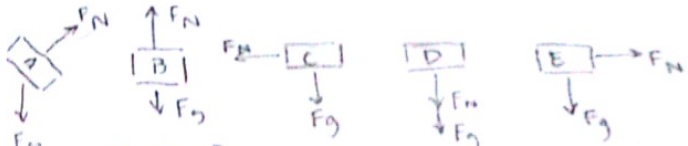
$\cancel{P} + \rho g h + \frac{1}{2}\rho v^2 = \cancel{P} + \rho g h + \frac{1}{2}\rho v^2$

P = constant.

Brian Chang, Joycelyn Su

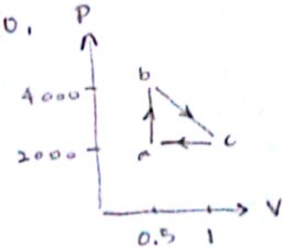
8.





$F_c = F_N - F_g$ $F_c = F_N$ $F_c = F_N + F_g$ $F_c = F_N$

10.



internal energy for bc

4000 (0.5) = 2000 (1)

$PV = nRT$ $PV \propto T$

0a, internal energy ↓ (work by)
temperature ↓

ab, internal energy ↑ (work on)
temperature ↑

19.

The electric static field within the body of a conductor is 0.
Metal = conductor

So $V_{inner} = V_{outer}$

- Any point within the sphere, there is no change in V.

37. $Av = Av$
- don't make stupid mistake.
- use diameter/2 = radius and $A = \pi r^2$

(E)

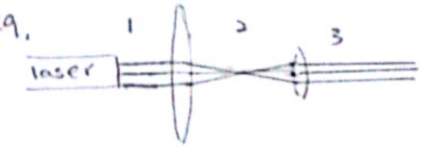
48. $v = f\lambda$

temperature ↑, density of air ↓
index of refraction of air ↓
Velocity of light ↑

v↑, λ↑, f is constant

(B)

49.



narrower than 1

50. $v = \sqrt{\frac{F_T}{\mu}}$ v↑

- either increase tension
or
decrease mass density

- nothing to do with string's length

52. $Q = CV$, V is constant
$U = \frac{1}{2}CV^2$

- C is 2x
- Q ⇒ 2x
- U ⇒ 2x

If v changes
- V ⇒ 2X
then
- Q ⇒ 2X
- U ⇒ 4X

54. p is always conserved
- But due to the push, energy changes.
- the smaller mass has higher velocity and $K = \frac{1}{2}mv^2$
- So higher velocity means higher KE.

Edward Yang
Jerry Deng

(69) $F_{net} = 2kg \cdot 10 \, m/s^2 = 20N$

$a = \frac{F_{net}}{m_{total}} = \frac{20N}{2kg + 4kg} = 3.3 \, m/s^2$ C

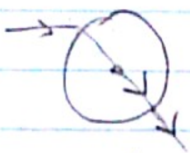
Force created by 2 kg mass being exerted on entire system, including the 4 kg mass

(A) No mass hung
(B) The mass hung is 1.0 kg
(D) The mass hung is 4.0 kg
(E) The mass hung is infinity (4 kg is negligible)

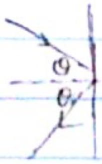
(65) Correct diagrams

A)

B)

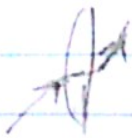


C).



D)

E)



E is correct

(63) Light can behave waves or particles depending on the situation

Wave: interference (slits, diffracting grating)
Polarization

Particles: photoelectric effect

E is completely wrong
A, B are incomplete.
C is wrong because it is not a mixture, we can't separate light into particles and waves.

(62) $E = -\frac{Z}{n^2}$ $n \uparrow$ $E \uparrow$

e^- absorb energy and step up, thus, its P.E. increases
B is completely the opposite
C, D, E are never correct

(55) $F = \underset{\text{ammeter}}{I} \, L \, \underset{\text{field sensor}}{B}$

A is incomplete, we need to know the length
C is lacking the measuring device of magnetic field
D has nothing to do with the question (step-ratio?)
E requires the disconnecting of wires (ammeter)

(54) P_A & P_B are always equal, momentum is always conserved

D & E are completely wrong (never correct)

$K = \frac{p^2}{2m}$ $m \uparrow$, $K \downarrow$

$m_a > m_b$

B & C are completely wrong due. ⟵ $K_a < K_b$

B: Same mass
C: stating B is heavier

Generated by CamScanner from intsig.com

(51) $Q = CV$

$U = \frac{1}{2} QV = \frac{1}{2} CV^2$

$\therefore$ if $C \times 2$

$Q \times 2$

$U \times 2$

(A) if C is halved

(B) if V is halved

(C) if nothing changes

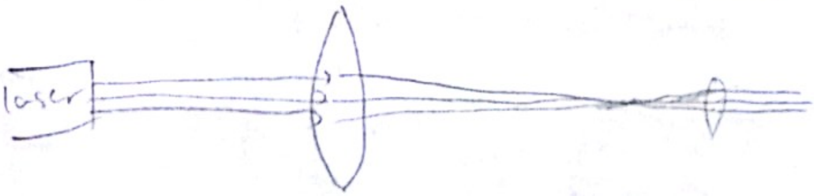
(E) if V doubles

(50) $v = \sqrt{\frac{F}{\mu}} = \sqrt{\frac{F}{m/L}}$ Just remember the equation

in order for v to $\uparrow$, $F\uparrow$ or $\mu\downarrow$.

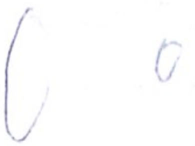
$\therefore$ I & III work II has nothing to do with this. B & D are wrong. A & C are incomplete

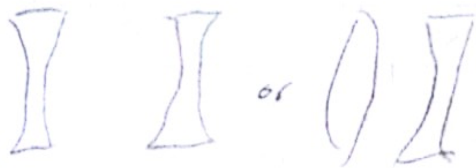
(49) Focal length same for lenses regardless of position

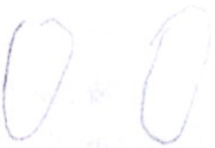


← narrower than original (A) is correct.

Consider; if convex lenses replaced with concave; one of each?

B: if initial is 

D: 

C: if both 

E: 

(48) $V \propto T$ if $P = k$.

if $T\uparrow$, $V\uparrow$

$\therefore d = \frac{m}{v}$ $d\downarrow$. $n\downarrow$

$\therefore v = \frac{c}{\lambda}$ $v\uparrow$

I. is completely wrong because f is constant.

II. is the opposite case. $v \propto \lambda$.

$\therefore$ III only

Stephen Wang

68. $F_g = mg = 2 \cdot 10 = 20N$

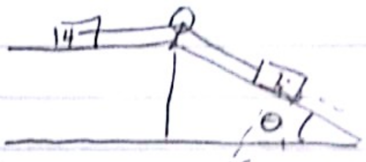
$a = \frac{F_g}{m} = \frac{20N}{4+2} = \frac{20N}{6kg} = 3.33\ m/s^2$

With friction: μ_k

$F_f = \mu_k F_N$

$a = \frac{F_g - F_f}{m}$

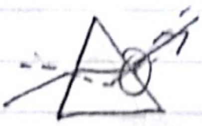
On an inclined plane with friction μ_{k1}, μ_{k2}



$F_g = m_2 g \cos\theta = \mu_{k1} F_N - \mu_{k2} m_2 g \sin\theta$

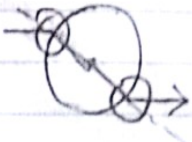
65.

a)

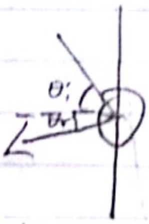


d)

b)



c)



$\theta_r < \theta_i$ → Use lens and images.

63. Particle-wave duality instead of wave-particle duality.

experiments

62. n decreases. He atom.

Wavelength of ejected photon.

58. $F_B = BIl$

ask equation

- what certain values are needed to use voltmeter and ammeter

No

Date

54. $p_A = p_B$ $v_A < v_B$
w/ friction
magnitude of momentum
initial velocity (collision)

52. $Q = CV$ $U = \frac{1}{2}CV$
$2Q = 2CV$ $2U = \frac{1}{2}(2C)V$
→ V is doubled

50. → resonant frequency
→ wavelength
→ harmonics

44. → same two lens added in reverse order
→ image properties
→ diverging and converging lens

48. I ✗ - f never changes III ✓ II ✗
- energy change

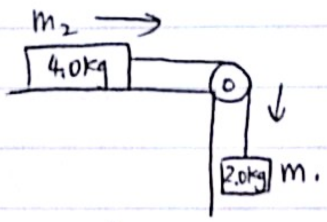
37. $v \propto v_i^2 \propto d^2$ $d \times 2 \rightarrow v^{\times 4}$
→ volume of fluid passing point in t s.

14. V is constant within a conductor
→ What is E.

10. 0 (isothermal)

Abigail Lee
Enyu Hsu

#69.



total force ? = $m.g = 2 \times 10 = 20N$

tension of the string? = $m.g = 20N$

acceleration of 4.0kg block?

$= \frac{F_{net}}{m_1+m_2} = \frac{20}{4+2} = 3.3 m/s^2$

acceleration of 2.0kg block?

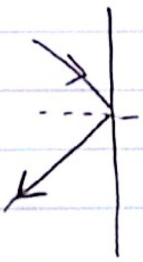
$= 3.3 m/s^2$

#65

(A)

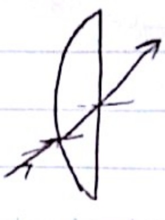
(B)

(C)



(D)

(E)



#63

wave property : Single & double slit, constructive & destructive.

particle property : photoelectric effect. momentum & collision.

#62

when n decreases, it emits photon.

when n increases, it absorbs photon (lifts up)

#58

$B = \frac{\mu_0}{2\pi} \frac{I}{r}$

$I = Br \times \frac{2\pi}{\mu_0}$.

B → magnetic field sensor

r → meterstick (distance from wire to magnetic source)

#54

S_A , S_B

Force ? equal (3rd law)

Acceleration ? $a_A < a_B$

Momentum ? $P_A = -P_B$ // $|P_A| = |P_B|$

Kinetic energy ? $m_A v_A = m_B v_B$ ↙ $v_A < v_B$

$m_A v_A^2 < m_B v_B^2$

$\frac{1}{2} m_A v_A^2 < \frac{1}{2} m_B v_B^2$

$K_A < K_B$

Generated by CamScanner from intsig.com

#52

$C = \frac{Q}{V}$ C ×2, V unchanged ——

$Q = CV \rightarrow 2CV \Rightarrow 2Q$

$U = \frac{1}{2}CV^2 \rightarrow \frac{1}{2} \cdot 2C \cdot V^2 \Rightarrow 2U$

—— C unchanged, V doubled ——

$Q = CV \rightarrow C \cdot 2V \Rightarrow 2Q$

$U = \frac{1}{2}CV^2 \rightarrow \frac{1}{2} \cdot C \cdot (2V)^2 \Rightarrow 4U$