

PHYS1026 endterm 2014 - 60 min

Tuesday, March 04, 2014 19:14

Block 1, 0 question(s), maximum score 0

Rubric

Block 2, 38 question(s), maximum score 57

Question block created by wizard

Please use constants as listed below:

$$c = 3 \times 10^8 \text{ m/s}$$

$$e = 1.6 \times 10^{-19} \text{ C}$$

$$m_e = 9.1 \times 10^{-31} \text{ kg}$$

$$m_p = 1.67 \times 10^{-27} \text{ kg}$$

$$h = 6.6 \times 10^{-34} \text{ Js}$$

$$\hbar = 1.05 \times 10^{-34} \text{ Js}$$

$$R = 8.3 \text{ J/K/mol (molar gas constant)}$$

$$N_A = 6.023 \times 10^{23} \text{ (Avogadro number)}$$

$$k_B = 1.38 \times 10^{-23} \text{ J/K}$$

1 of 38

Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MT1 : Easy

MC's Taxonomy : 1 Knowledge

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

At the nano-scale the heat dissipation to the surrounding is [1]

- A problem, as the power dissipation is not effective due to tunneling
- A problem, since heat dissipation depends on the area of the object
- As much of a problem as at the macroscopic scale
- Not a problem, since the power is dissipated more efficiently thanks to scattering

IF choice b. is selected

Set score to 1

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MT1 : Easy

MC's Taxonomy : 1 Knowledge

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

A cantilever of length $L=15\mu\text{m}$ and thickness $t=100\text{nm}$ has a resonance frequency $\omega_0 = 100\text{MHz}$. The resonance frequency of a cantilever of the same material, but half the thickness and double the length has [1]

- A resonant frequency $\omega_0=12.5\text{MHz}$
- A resonant frequency $\omega_0=400\text{MHz}$
- The same resonant frequency
- A resonant frequency $\omega_0=50\text{MHz}$

IF choice a. is selected

Set score to 1

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MT1 : Easy

MC's Taxonomy : 1 Knowledge

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

Calculate the average distance of a 2 micron bead in water from a starting point after 1s (use $\mu=6\pi n^*a$, $n= 10^{-3}$ P s for water). [3]

- ~1 micron
- ~1mm
- ~100micron
- ~1nm

IF choice a. is selected

Set score to 3

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MT1 : Easy

MC's Taxonomy : 1 Knowledge

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

The quantum mechanical formula for blackbody radiation: [1]

- Explains why there are more Ultraviolet components in the experimntal spectrum of a blackbody
- has a wavelength dependence that is similar to the classical formula
- Gives a similar result to the classical formula for low frequencies
- Gives a similar result to the classical formula for high frequencies

IF choice c. is selected

Set score to 1

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MT1 : Easy

MC's Taxonomy : 1 Knowledge

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

The modes (degrees of freedom) of a blackbody: [1]

- Are equally occupied (occupation depends on the temperature)
- Have an associated population that depends on the frequency
- Have higher energy for lower frequencies
- Have energies that are the constant for all frequencies

IF choice b. is selected

Set score to 1

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MT1 : Easy

MC's Taxonomy : 1 Knowledge

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

Observation of interference in an electron interferometer requires ... [1]

- electrons being stationary
- absence of measurements of the position of electrons
- low enough temperature.
- electrons travelling through one by one

IF choice b. is selected

Set score to 1

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MT1 : Easy

MC's Taxonomy : 1 Knowledge

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voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

In the double slit experiment, by the measuring which slit the particle went through [1]

- It is possible to prove that the particle is passing through both slits.
- The measurement is impossible to perform
- The position of the particle is changed
- The interference pattern is washed out

IF choice d. is selected

Set score to 1

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MT1 : Easy

MC's Taxonomy : 1 Knowledge

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voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

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Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

Estimate the de Broglie wavelength of an a 10g bullet traveling at 400m/s. [2]

- $\sim 10^{-34}\text{m}$
- $\sim 10^{-31}\text{m}$
- $\sim 10^{-21}\text{m}$
- $\sim 0.1\text{am}$

IF choice a. is selected

Set score to 2

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MT1 : Easy

MC's Taxonomy : 1 Knowledge

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voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

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Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

If an electron is in the $n=25$ Rydberg state, what is its speed compared to the electron in the lowest state? [2]

- 5 times faster
- 25 times slower
- 25 times faster
- 5 times slower

IF choice c. is selected

Set score to 2

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MT1 : Easy

MC's Taxonomy : 1 Knowledge

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voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

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Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

If the ground state of hydrogen is 13.6eV below the ionisation potential energy, what is the energy of the second excited state of hydrogen (measured from the same ionisation energy)? [3]

- 27.2eV
- 6.8eV
- 4.5eV
- 1.5eV

IF choice d. is selected

Set score to 3

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MT1 : Easy

MC's Taxonomy : 1 Knowledge

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

The lowest Bohr orbital radius $a_B=50\text{pm}$ for hydrogen. From this calculate what is the radius of the $n=4$ orbit in oxygen (atomic number 8)? [3]

- 10pm
- 1.6pm

- 3pm
 - 100pm
-

IF choice d. is selected

Set score to 3

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MT1 : Easy

MC's Taxonomy : 1 Knowledge

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voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

The difference between fermions and bosons is that: [1]

- Fermions have negative spin, while bosons have positive spins
 - Fermions at zero temperature are all in the ground state, while bosons fill also excited states
 - Bosons can condense in the ground state low temperature, and fermions cannot
 - There is no difference between fermions and bosons at zero temperature
-

IF choice c. is selected

Set score to 1

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

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voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

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Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

The energy of electrons in gold is 1.2eV below that in vacuum. A gold tip is scanned over a surface and locked at a height where the probability for electrons to tunnel across to the conducting substrate is 30%. What is the height of the tip? [3]

- 0.1nm
- 2nm
- 10nm
- 23pm

IF choice a. is selected

Set score to 3

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

What is the exponential decay length of the probability of finding an electron inside a barrier when its energy is 4eV below the barrier height? [2]

- 0.1nm
- 1nm
- 10nm
- 1pm

IF choice a. is selected

Set score to 3

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

What is the smallest feature that can be resolved in an optical microscope at 500 nm of numerical aperture 0.2?
[2]

- 1.25um
- 0.8um
- 0.2um
- 0.5um

IF choice a. is selected

Set score to 2

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

The scattering of light from a small particle of diameter $2\mu\text{m}$ is recorded in a particular colour of laser illumination. If the laser wavelength is halved, what size particle would restore the scattering pattern to the same angle dependence? [2]

- $2\mu\text{m}$
- $4\mu\text{m}$
- $0.5\mu\text{m}$
- $1\mu\text{m}$

IF choice d. is selected

Set score to 2

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

What is the uncertainty in the position (Δx) of an electron propagating with a velocity of $v = 3 \cdot 10^6$ m/s and an velocity uncertainty of $\Delta v = 0.1\%$? [2]

- 73 nm
- 100 nm
- 240 nm
- 23 nm

IF choice c. is selected

Set score to 2

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

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voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

By equating the rest mass of a proton with its electrostatic energy, estimate the classical radius of a proton (use $k=c^2 \cdot 10^{-7}$). [3]

- 3fm
- 0.1fm
- 10am
- 1.6am

IF choice d. is selected

Set score to 3

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

What is the smallest feature that can be resolved in a 1keV electron microscope of numerical aperture 0.1? [3]

- 0.02nm
- 0.1nm
- 0.2nm
- 0.6nm

IF choice c. is selected

Set score to 3

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

A scanning tunnelling microscopy cannot be used to map the atoms on a glass surface because [1]

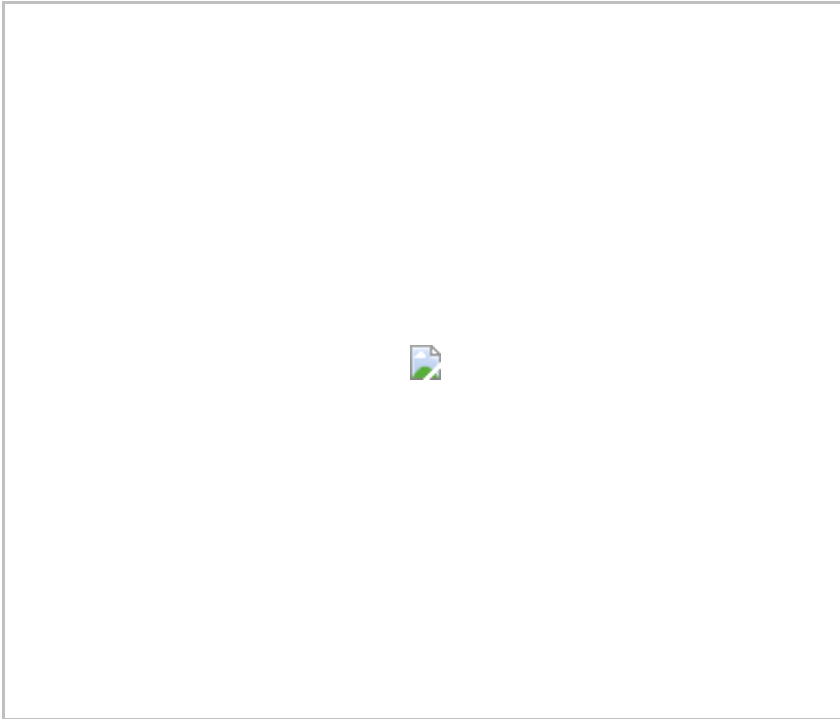
- the atoms are not regularly arranged
- glass is transparent
- glass is insulating
- the atoms are slowly moving

IF choice c. is selected

Set score to 1

21 of 38

Which information could you most easily retrieve from the 150nm square AFM image below? (height in nm is colour coded)



- the composition of the material
- the height of each atomic layer
- the mechanism of crystal growth
- the binding energy of the atoms

IF choice b. is selected

Set score to 1

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

In the lithography process for making nanostructures, what step immediately follows exposure to UV light? [1]

- chemical development
- deposition of resist
- deposition of metal
- selective etching of the substrate

IF choice a. is selected

Set score to 1

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

In electron beam lithography...[1]

- the whole pattern is written in a single exposure step
- the feature size depends mainly on the mask features
- no chemical development is needed
- the resolution depends on the electron energy

IF choice d. is selected

Set score to 1

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

To make a 10nm quantum box of Indium Phosphide, you would be better using: [1]

- isotropic wet chemical etching
- anisotropic etching
- self-assembly
- nanoimprint lithography

IF choice c. is selected

Set score to 1

25 of 38

Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

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Paper 1 : Aeroskills

A transmission electron microscope can [1]

- see individual atoms
- can watch electrons move around
- only image crystalline samples

- only look at thin samples
-

IF choice d. is selected

Set score to 1

26 of 38

Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

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Paper 1 : Aeroskills

Mie scattering from particles allows one to measure their size without one needing to know their [1]

- refractive index
 - their shape
 - their orientation
 - their speed
-

IF choice d. is selected

Set score to 1

27 of 38

Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

What is top-down nanofabrication?

- Patterning large-scale substrates into nanodevices using lithography
- Self-assembling nanostructures in one process
- Assembling nanoparticles on a substrate one by one
- Making structures from the top side first and then successive underneath layers

IF choice a. is selected

Set score to 1

28 of 38

Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

What would be the least accurate way of measuring the size of a nanoparticle? [1]

- imaging it in an optical microscope
- measuring its Mie scattering strength
- observing it by firing it through a double slit apparatus
- imaging it in an electron microscope

IF choice a. is selected

Set score to 1

29 of 38

Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

Why would you not use 1eV electrons in an electron microscope to directly image atoms in a crystal? [1]

- the electrons would collide with the atoms
- the electron wavelength is too large to resolve atomic spacings
- the electrons would be captured by the atoms and never escape
- the electrons would bounce off the crystal

IF choice b. is selected

Set score to 1

30 of 38

Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

Why is the sky blue? [1]

- This due to air pollution.
 - Particles in Earth's atmosphere do emit light in the blue spectral range.
 - Intensity of Rayleigh scattered light goes with λ^{-4} .
 - The spectrum of the light from the sun contains only blue lines.
-

IF choice c. is selected

Set score to 1

31 of 38

Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

Which scanning probe microscopy can best image single atoms? [1]

- magnetic force microscopy
 - atomic force microscopy
 - Kelvin probe microscopy
 - scanning tunnelling microscopy
-

IF choice d. is selected

Set score to 1

32 of 38

Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

MT2 : easy

voortgang : 01

Alcatel-Lucent Difficulty Levels : Easy

Version : 1

Bloom's taxonomy : 4 Analysis

Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

How does the size of laser speckles increase with distance (L) from the reflecting surface? [1]

- is independent to L
- scales quadratic with L
- scales linear with L
- scales with inverse distance L

IF choice c. is selected

Set score to 1

33 of 38

Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

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Alcatel-Lucent Difficulty Levels : Easy

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Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

In core/shell nanocrystals [1]

- the shell is used to increase the emission probability of the quantum dot
- the band-gap of core and shell material is the same
- the core is made by a less conductive semiconductor than the shell
- the shell is used to confine electrons in the quantum dot

IF choice a. is selected

Set score to 1

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Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MC's Taxonomy : 1 Knowledge

MT1 : Easy

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Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

Semiconductor quantum dots... [1]

- can confine electrons using different effects in different directions
- can just be fabricated by self-assemble methods
- have emission frequencies that depend on the dimension but not on the semiconductor
- are usually bigger then 50nm

IF choice a. is selected

Set score to 1

35 of 38

Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MT1 : Easy

MC's Taxonomy : 1 Knowledge

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Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

During an experiment of surface plasmon resonance, a change in the critical angle of incident light depends on:
[1]

- the speed of the analyte flow
- the molecular weight of the ligand
- the pH of the buffer running in the fluidic system
- the refractive index of the medium within 300 nm of the gold surface

IF choice d. is selected

Set score to 1

36 of 38

Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

MT1 : Easy

MC's Taxonomy : 1 Knowledge

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Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

Two appropriately chosen fluorophores trigger Forster resonance energy transfer (FRET) when the distance separating them is: [1]

- zero
- ~ 25 nm
- between 50 and 100 nm
- less than 10 nm

IF choice d. is selected

Set score to 1

37 of 38

Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

QType : MC

Paper : 1

Difficulty - works ahead : easy

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Alcatel-Lucent Difficulty Levels : Easy

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Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

In Quantum Key distribution; [1]

- Information is quantum-teleported from the sender to the receiver
- Communication is secure because decryption is computationally hard to achieve
- Information is transferred faster than classical key distribution
- The security is guaranteed by the collapse of the wave-function

IF choice d. is selected

Set score to 1

38 of 38

Paper 2 : Aeroskills

Paper 3 : Aeroskills

Random : Yes

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Paper : 1

Difficulty - works ahead : easy

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Blooms Taxonomy : 1 Knowledge

Paper 1 : Aeroskills

In a quantum computer, information... [1]

- is encoded on the speed of a quantum particle

- can be efficiently calculated classically
 - is encoded on the states of a two level system
 - has always to be described in a quantum mechanical way
-

IF choice c. is selected

Set score to 1

Feedback

0% to 100%

