

MODEL SIMULATION FOR THE END-OF-TERM 3 EXAMINATION 2025/2026



تم تحميل هذا الملف من موقع المناهج الإماراتية

موقع المناهج ← المناهج الإماراتية ← الصف الثاني عشر المتقدم ← فيزياء ← ملفات متنوعة ← الملف

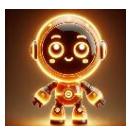
تاريخ إضافة الملف على موقع المناهج: 2026-05-26 17:13:45

ملفات اكتب للمعلم اكتب للطالب | اختبارات الكترونية | اختبارات | حلول | عروض بوربوينت | أوراق عمل
منهج انجليزي | ملخصات وتقارير | مذكرات وبنوك | الامتحان النهائي | للمدرس

المزيد من مادة
فيزياء:

إعداد: Abdelbaset Mohamed

التواصل الاجتماعي بحسب الصف الثاني عشر المتقدم



صفحة المناهج
الإماراتية على
فيسبوك

الرياضيات

اللغة الانجليزية

اللغة العربية

التربية الاسلامية

المواد على تلغرام

المزيد من الملفات بحسب الصف الثاني عشر المتقدم والمادة فيزياء في

MODEL SIMULATION FOR THE END-OF-TERM 3 EXAMINATION 2025/2026
PHYSICS — STANDARD TERMINAL EVALUATION (MODEL 3)

	STUDENT NUMBER	
.....	STUDENT NAME	
.....	SCHOOL / CENTER	
Grade 12 Advanced (Physics)	CLASS / GRADE	
.....	SECTION GROUP	
Advanced Academic Track (General & Advanced Stream)	EDUCATION STREAM	
PHYSICS (Quantum Mechanics & Nuclear Physics Core)	SUBJECT DISCIPLINE	

PART ID Question Section	FIRST GRADER Marker 1	SECOND GRADER Marker 2	MODERATOR Reviewer			
	Name	Mark Achieved	Name	Mark Achieved	Name	Mark Achieved
PART 1 (25 MCQ)						

GRAND TOTAL Max Score		MARKER VERIFICATION Grading Official		REVIEWER MODERATION Moderation Auditor	
		Official Name	Signature	Official Name	Signature
	100 Marks	100 / 100			



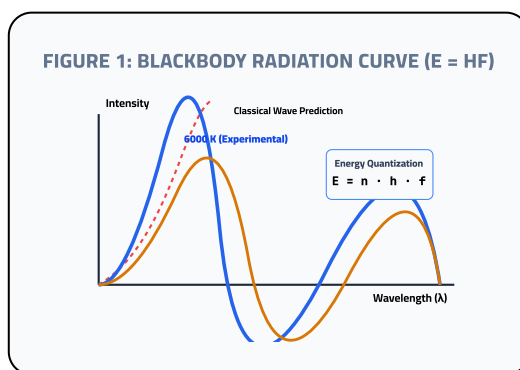
« ENCIRCLE THE LETTER CORRESPONDING TO THE CORRECT OPTION. EACH QUESTION CARRIES EXACTLY (4 MARKS) »

QUESTION NO. 1 LO 1: Planck's Quantum Concept and Energy of a Single Quantum

4 Marks

Which of the following formulas represents the allowed energy states of a quantum oscillator? (where n is an integer)

REFERENCE FIGURE:



A $E = (n + 1/2) hf$

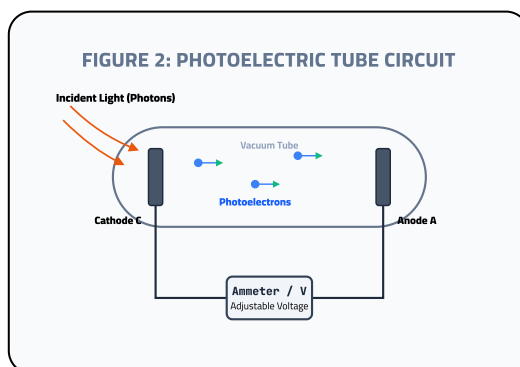
B $E = n \cdot h \cdot f$

C $E = h \cdot f / n$

D $E = n^2 \cdot h \cdot f$

Which model of light did Einstein successfully adopt to explain the photoelectric effect?

REFERENCE FIGURE:

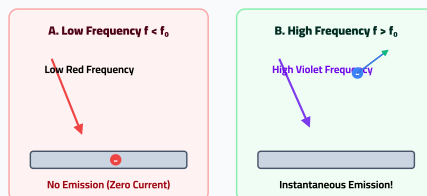


- | | |
|----------|--|
| A | The purely classical wave model of Maxwell |
| B | The particle model (quantized energy packets called photons) |
| C | Aristotle's continuous theory of the cosmos |
| D | Newton's continuous mechanical stream |

If extremely intense, bright light with a frequency less than the threshold frequency ($f < f_0$) shines on a metal plate, what happens?

REFERENCE FIGURE:

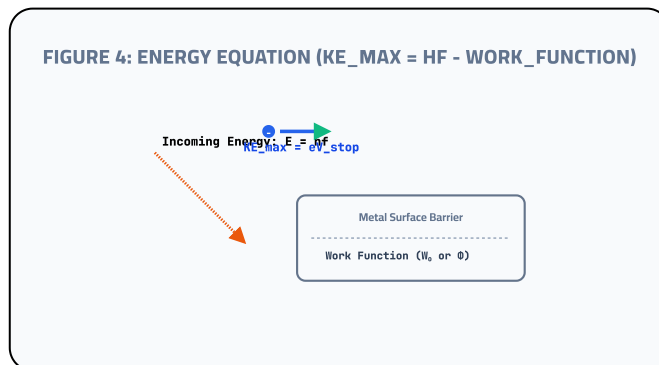
FIGURE 3: FREQUENCY VS. EMISSION CONDITION



- A** Electrons are emitted after some delay due to classical energy accumulation
- B** No electrons are emitted at all and the current remains zero
- C** The metal plate instantly breaks down into core elements
- D** Photoelectrons are emitted with high kinetic energy

What is the relationship between the maximum kinetic energy of photoelectrons ($KE_{\max}$) and the stopping potential (V_{stop})?

REFERENCE FIGURE:



A $KE_{\max} = e \cdot V_{\text{stop}}$

B $KE_{\max} = V_{\text{stop}} / e$

C $KE_{\max} = h \cdot V_{\text{stop}}$

D $KE_{\max} = V_{\text{stop}}^2$

What does light intensity physically represent in quantum theory?

REFERENCE FIGURE:

FIGURE 5: PHOTOELECTRIC INDEPENDENCE LAWS

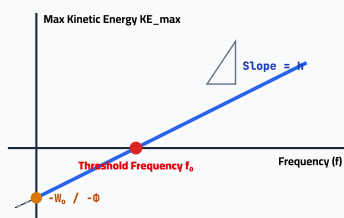


- A** The total speed of the photon stream
- B** The rate of photons striking a unit area per second
- C** The total mass-equivalent of the electromagnetic field
- D** The absolute frequency of the Bohr circular orbits

If we project the straight-line graph backwards to intersect the vertical y-axis (y-intercept), what does this intersection point represent?

REFERENCE FIGURE:

FIGURE 6: KE_MAX VS. FREQUENCY CURVE



A The negative value of the work function ($-\phi$)

B The threshold frequency (f_0)

C Planck's constant (h)

D The velocity of the emitted electrons

Calculate the de Broglie wavelength of an electron (mass = 9.11×10^{-31} kg) moving at a velocity of 2.0×10^6 m/s. ($h = 6.63 \times 10^{-34}$ J·s)

REFERENCE FIGURE:

FIGURE 7: WAVE-PARTICLE DE BROGLIE CONCEPT



A 3.64×10^{-10} m

B 1.88×10^{-10} m

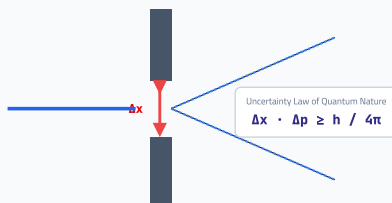
C 3.64×10^{-34} m

D 5.55×10^{-9} m

Calculate the minimum uncertainty in momentum (Δp) of an electron if the uncertainty in its position is $1.0 \times 10^{-10} \text{ m}$. ($h = 6.63 \times 10^{-34} \text{ J}\cdot\text{s}$)

REFERENCE FIGURE:

FIGURE 8: HEISENBERG UNCERTAINTY (LASER SLIT EXPERIMENT)



A $5.28 \times 10^{-25} \text{ kg}\cdot\text{m/s}$

B $1.60 \times 10^{-19} \text{ kg}\cdot\text{m/s}$

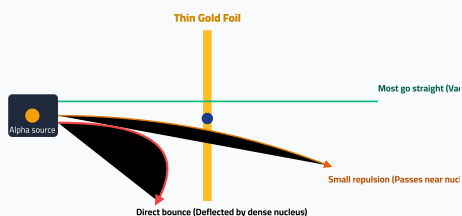
C $5.28 \times 10^{-34} \text{ kg}\cdot\text{m/s}$

D $2.34 \times 10^{-9} \text{ kg}\cdot\text{m/s}$

What was the most surprising observation when alpha particles bombarded the gold foil?

REFERENCE FIGURE:

FIGURE 9: RUTHERFORD GOLD FOIL ALPHA SCATTERING

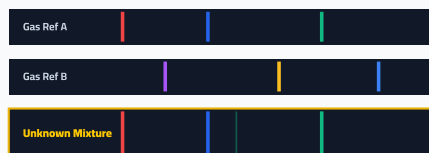


- | | |
|---|---|
| A | 100% of the alpha particles bounced straight back |
| B | The vast majority of alpha particles passed straight through the foil undeflected |
| C | The gold foil turned into silver |
| D | The detecting screen burst into flames upon exposure |

In spectroscopy experiments, how are gas atoms in discharge tubes cataloged and excited?

REFERENCE FIGURE:

FIGURE 10: IDENTIFICATION OF GASES VIA EMISSION LINES



Gas Identification via Unique Spectral Lines Comparison

- A By applying extremely high atmospheric pressure over 100 atm
- B By applying a high electric potential difference that excites orbital electrons to higher energy states
- C By freezing the tubes down to absolute zero
- D By alloying the gas with copper and gold

What name is given to the dark absorption lines observed in the continuous spectrum of the Sun?

REFERENCE FIGURE:

FIGURE 11: CONTINUOUS VS. BLACK-LINE ABSORPTION SIGNATURE



Unique Absorption Spectrum Shows as Distinct Black Lines

Missing wavelengths are unique fingerprints of elements

A Balmer lines

B Fraunhofer lines

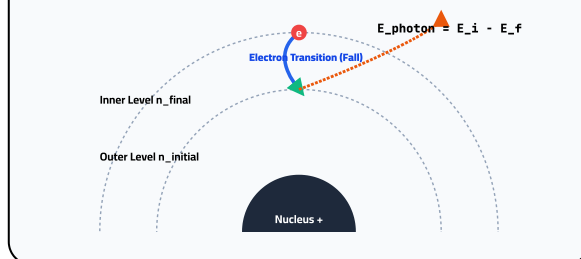
C Rutherford lines

D Lyman lines

An electron transitions from an energy level of -1.51 eV to a lower level of -3.40 eV . What is the energy of the emitted photon?

REFERENCE FIGURE:

FIGURE 12: QUANTUM TRANSITION ENERGY LEVEL JUMP



A 4.91 eV

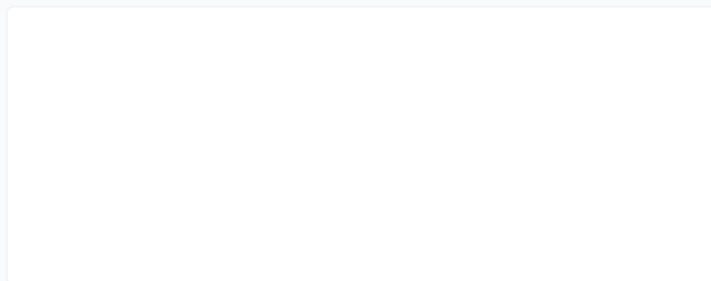
B 1.89 eV

C 1.51 eV

D 0.55 eV

What is the radius of the second Bohr orbit ($n = 2$) in a hydrogen atom?

REFERENCE FIGURE:

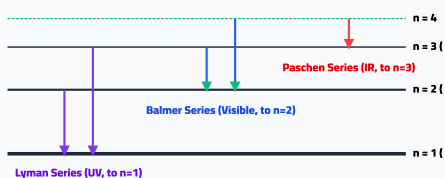


- A $5.29 \times 10^{-11} \text{ m}$
- B $2.12 \times 10^{-10} \text{ m}$ (or four times a_0)
- C $1.06 \times 10^{-10} \text{ m}$
- D $8.46 \times 10^{-10} \text{ m}$

What orbital level n_f serves as the final level for the infrared Paschen Series?

REFERENCE FIGURE:

FIGURE 15: HYDROGEN SPECTRAL EMISSION SERIES



A

 $n_f = 1$

B

 $n_f = 2$

C

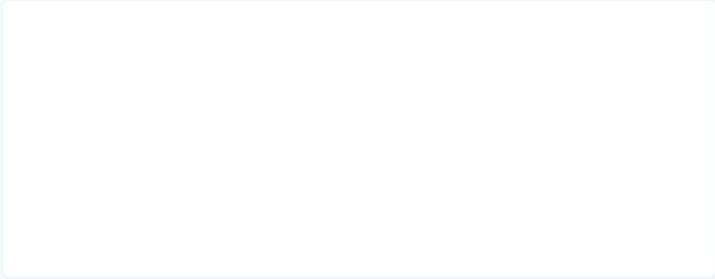
 $n_f = 3$ (Paschen series final level)

D

 $n_f = 4$

What does a high density of dots in an electron cloud diagram represent?

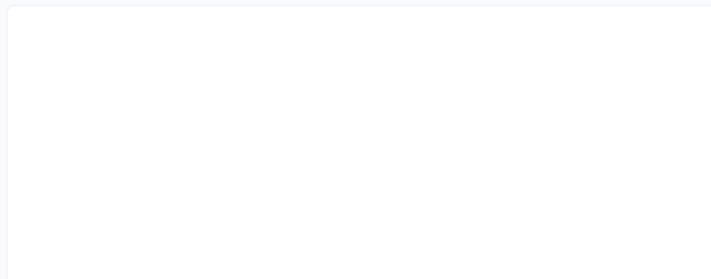
REFERENCE FIGURE:



- A** A large concentration of positive charge
- B** A high probability of finding the electron in that region
- C** A high friction zone that slows the electron down
- D** A cluster of neutrons colliding

What condition is necessary for laser amplification to occur, whereby more atoms reside in excited states than in ground states?

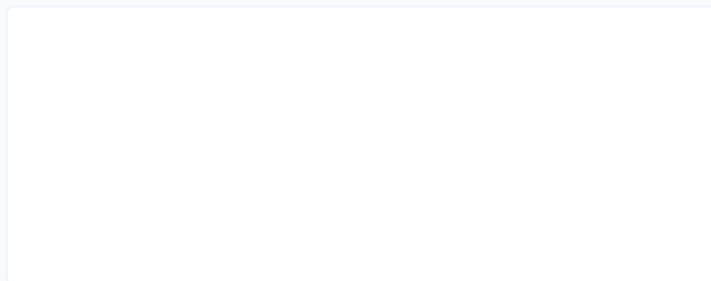
REFERENCE FIGURE:



- | | |
|---|-----------------------|
| A | Population Inversion |
| B | Spontaneous Decay |
| C | Thermal Stabilization |
| D | Nuclear Fusion |

How many protons and neutrons are contained in a Uranium-235 nucleus ($^{235}_{92}\text{U}$)?

REFERENCE FIGURE:



A 92 protons, 143 neutrons

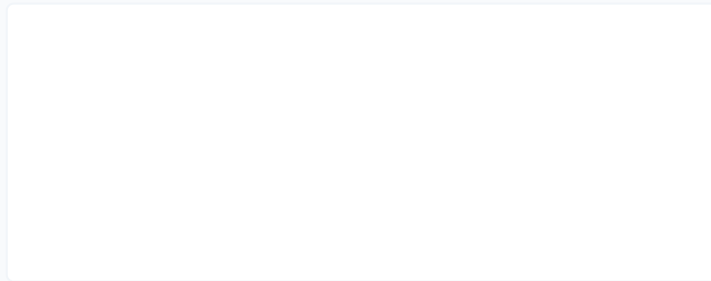
B 92 protons, 235 neutrons

C 143 protons, 92 neutrons

D 92 protons, 92 neutrons

What formula is used to calculate the mass defect (Δm) of a nucleus with Z protons and N neutrons?

REFERENCE FIGURE:



A $\Delta m = (Z \cdot m_p + N \cdot m_n) - m_{\text{nucleus}}$

B $\Delta m = m_{\text{nucleus}} - (Z \cdot m_p + N \cdot m_n)$

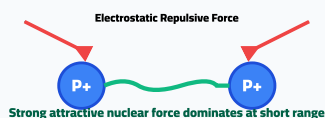
C $\Delta m = Z \cdot m_p - N \cdot m_n$

D $\Delta m = m_{\text{nucleus}} / (Z + N)$

How does the strong nuclear force treat the different charges of nucleons?

REFERENCE FIGURE:

FIGURE 19: STRONG NUCLEAR FORCE VS. ELECTROSTATIC REPULSION



A

It is completely charge-independent, binding proton-proton, neutron-neutron, and proton-neutron pairs with equal strength

B

It only attracts neutral particles like neutrons while ignoring protons

C

It only interacts with massless particles like photons

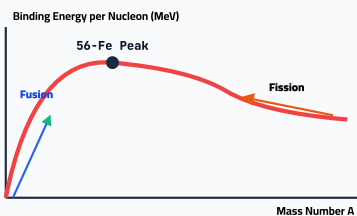
D

It is only attractive if the participating nucleons have opposite charge signs

For very light nuclei on the left side of the stability peak ($A < 56$), which process is favored to increase stability?

REFERENCE FIGURE:

FIGURE 20: BINDING ENERGY CURVE PER NUCLEON

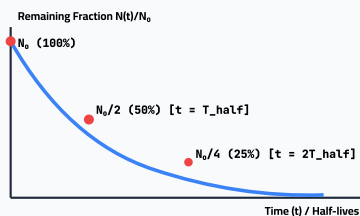


- | | |
|---|---|
| A | Radioactive gamma decay only |
| B | Nuclear Fusion (combining light nuclei to form heavier, more stable nuclei) |
| C | Nuclear Fission (splitting into lighter fragments) |
| D | Evaporating neutrons to enter a gaseous state |

What is emitted during gamma (γ) decay, and how does it affect the mass and atomic numbers of the parent nucleus?

REFERENCE FIGURE:

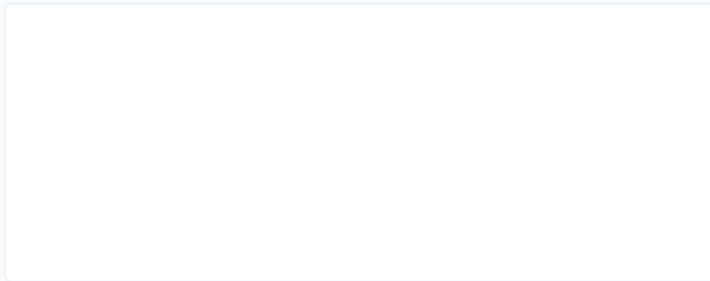
FIGURE 24: EXPONENTIAL RADIOACTIVE DECAY CURVE



- | | |
|---|--|
| A | A high-energy photon is emitted; both mass number A and atomic number Z remain unchanged |
| B | An electron is emitted; Z increases by one |
| C | A helium nucleus is emitted; A decreases by 4 |
| D | A positron is emitted; Z decreases by 1 |

What is the mathematical relationship between the decay constant (λ) and the half-life ($T_{1/2}$) of an isotope?

REFERENCE FIGURE:



A $\lambda = 0.693 / T_{1/2}$

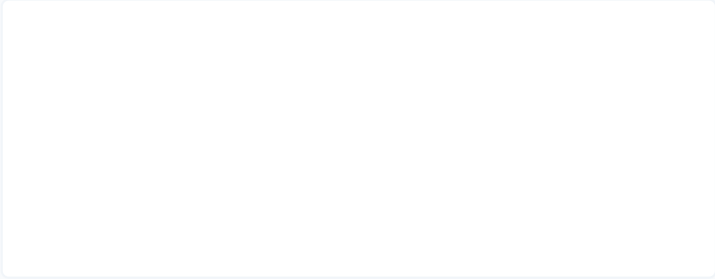
B $\lambda = T_{1/2} / 0.693$

C $\lambda = T_{1/2} \cdot \ln(13.6)$

D $\lambda = (T_{1/2})^2$

What is the function of the 'Moderator' (such as water or graphite) in a nuclear reactor?

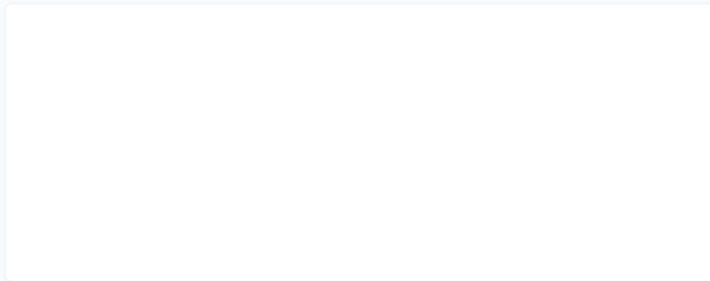
REFERENCE FIGURE:



- | | |
|---|--|
| A | To absorb neutrons completely and stop the reactor |
| B | To slow down fast-moving neutrons to thermal speeds, making them more likely to trigger fission in Uranium-235 |
| C | To accelerate neutrons to hit the cladding |
| D | To cool the external turbine using condensation |

Why are extremely high temperatures (millions of Kelvin) required to initiate nuclear fusion?

REFERENCE FIGURE:



A

To provide light nuclei with enough kinetic energy to overcome their Coulomb electrostatic repulsion and enter the strong force range

B

To freeze the atomic core and align the protons

C

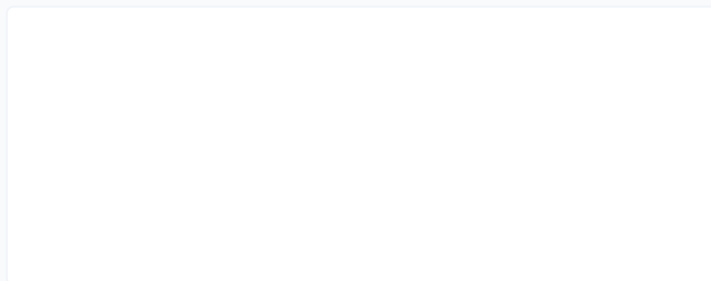
To convert neutrons into electrons

D

To allow alpha particles to decay into gamma rays

What is the charge of an individual Up quark (u) and Down quark (d), respectively? (in terms of proton charge e)

REFERENCE FIGURE:



A Up is $+2/3 e$, Down is $-1/3 e$

B Up is $+1 e$, Down is $-1 e$

C Up is $-1/3 e$, Down is $+2/3 e$

D Up is $+1/2 e$, Down is $-1/2 e$

« END OF EXAMINATION (MODEL 3) »