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| Academic Year<br>العام الدراسي | 2025/2026 |
| Term<br>الفصل | T3 |
| Subject<br>الموضوع | Physics<br>**(Inspire)** |
| Grade<br>الصف | 12 |
| Stream<br>المسار | Advanced/المتقدم |
| Number Of MCQ<br>عدد الأسئلة الموضوعية | 25 |
| Markes of MCQ<br>درجة الأسئلة الموضوعية | 4 |
| Type of All Questions<br>نوع كافة الأسئلة | MCQ/ الأسئلة الموضوعية |
| Maximum Overall Grade<br>الدرجة القصوى الممكنة | 100 |
| Exam Duration<br>مدة الامتحان | 120 min. |
| Mode of Implementation<br>طريقة التطبيق | Swift Assess |
| **Calculator**<br>الآلة الحاسبة | Allowed<br>مسموحة |

| | Question*<br>السؤال* | Learning Outcome/Performance Criteria**<br>ناتج التعلم/ معايير الأداء** | المرجع في كتاب الطالب (النسخة الانجليزية)<br>Reference(s) in the Student Book (English Version)<br>مثال/تمرين<br>Example/Exercise | صفحة<br>Page |
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| MCQ - الأسئلة الموضوعية | 1 | Explain Planck's concept of quantization of energy<br>Calculate the energy emitted or absorbed by a vibrating atom in a solid using the equation | St. textbook<br>Practice problems | 68<br>72 |
| | 2 | Define the photoelectric effect.<br>Explain how the photoelectric effect occurs when light shines on a metal surface. | St. textbook | 69 |
| | 3 | Explain that electrons are ejected from the surface of a metal only if the frequency of the radiation is greater than a threshold frequency | St. textbook | 70 |
| | 4 | Calculate the energy of a photon given its wavelength or frequency.<br>Calculate the maximum kinetic energy of an electron ejected due to the photoelectric effect | Example problem 1,2<br>Practice problems | 74,76 |
| | 5 | Explain that the maximum kinetic energy of photoelectrons is independent of the intensity of incident electromagnetic radiation.<br>Explain that the current due to photoelectrons (photoelectric current) is proportional to the intensity of incident electromagnetic radiation. | St. textbook | 70-73 |
| | 6 | Interpret the graph of maximum kinetic energy of an electron ejected from a metal versus the frequency of incident photon and determine graphically the threshold frequency and Planck's constant. | St. textbook | 75 |
| | 7 | Describe the de Broglie wavelength as the wavelength associated with a moving particle.<br>Calculate the de Broglie wavelength for a moving particle ($\lambda = \frac{h}{P} = \frac{h}{mv}$) | Example problem 3<br>Practice problems | 80 |
| | 8 | Describe that the more precisely a particle's position is measured, the more the uncertainty in simultaneously measuring the particle's momentum, and vice versa | St. textbook | 81 |
| | 9 | Describe the electron distribution within the atom according to Thomson's model<br>Describe how Rutherford's alpha particles scattering experiment led to the revision of Thomson's model of the atom and the introduction of the atomic nucleus | St. textbook | 82-83 |
| | 10 | Explain how the composition of an unknown gas sample can be determined using its emission and absorption spectrum | St. textbook | 84-85 |
| | 11 | Explain that the absorption spectrum of an element is a unique pattern, which serves as a fingerprint of that element. | St. textbook | 85-86 |
| | 12 | Explain that an atom can transition from an initial energy state ($E_i$) to a final energy state ($E_f$) by absorbing or emitting a photon whose energy equals the difference between the two states. | St. textbook | 85-86 |
| | 13 | Describe Rutherford's nuclear model of the atom, as a small dense positively charged nucleus surrounded by orbiting electrons (planetary model), and explain why this model cannot explain the stability and the observed line emission spectra of atoms. | St. textbook | 86-87 |
| | 14 | Calculate the total energy of a Hydrogen atom<br>Describe that the radius of the electron's orbit in Hydrogen atom is proportional to $n^2$, while the energy of the atom is inversely proportional to $n^2$, | Example problem 4<br>Practice problems | 92 |
| | 15 | Explain that the Lyman, Balmer and Paschen series and the energy levels and transitions correspond to them | St. textbook | 91 |
| | 16 | Calculate the energy, frequency, and wavelength of an emitted or absorbed photon as an atom transition from an initial energy level to a final energy level | Example problem 5<br>Practice problems | 93 |
| | 17 | Illustrate that, in the Bohr model, the circumference of a stable electron obit must be an integer multiple of the de Broglie wavelength ($2\pi r = n\lambda$), as a result of combining de Broglie and Bohr ideas. | St. textbook | 95 |
| | 18 | Define the mass number, A, as the total number of nucleons (protons and neutrons) in an atomic nucleus (A=Z + N).<br>Represent nuclei of isotopes using the notation, where 'Z' is the atomic number and 'A' is the mass number | St. textbook<br>Practice problems | 107-108<br>109 |
| | 19 | Define the strong nuclear force as a very short-range attractive force that acts between nucleons (proton-proton, neutron-neutron, and proton-neutron) when they are very close together, as in the atomic nucleus.<br>Define the mass defect as the difference between the actual mass of an atomic nucleus and the sum of the masses of its constituting nucleons. | St. textbook | 109 |
| | 20 | Calculate the mass defect of an atomic nucleus.<br>Calculate the binding energy of an atomic nucleus. | Example problem 1<br>Practice problems | 111 |
| | 21 | Compare alpha, beta, and gamma decays in terms of the particles emitted their electric charge, their penetrating ability, and the resulting nuclear transmutation | St. textbook | 114 |
| | 22 | Explain that electric charge is conserved in a nuclear reaction, so the total charge is the same on both sides of the nuclear equation | Example problem 2<br>Practice problems | 116 |
| | 23 | Write a balanced nuclear equation to describe a simple nuclear reaction, such as the bombardment of a nucleus by an alpha particle | Example problem 3<br>Practice problems | 117 |
| | 24 | Analyze a graph of the number of undecayed radioactive nuclei versus time, and determine the half-life and the amount of radioactive nuclei present at a certain time t<br>Calculate the amount of radioactive nuclei remaining in a sample | St. textbook<br>Practice problems | 117-118<br>119 |
| | 25 | Define and describe nuclear fission and nuclear fusion | St. textbook | 119-123 |

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| * | Questions might appear in a different order in the actual exam. |
| * | قد تظهر الأسئلة بترتيب مختلف في الامتحان الفعلي |
| ** | As it appears in the textbook, LMS, and (Main_IP). |
| ** | كما وردت في كتاب الطالب وLMS والخطة الفصلية. |

PHYSICS - Coverage G 12 Advanced-INSPIRE- EOT 3 -2025-2026-(DRAFT)