name:	Family name:	Group:	Time= 1 Hour

Correction of Technical English Exam

Photoelectric interactions usually occur with electrons that are firmly bound to the atom, that is, those with a relatively high binding energy. Photoelectric interactions are most probable when the electron binding energy is only slightly less than the energy of the photon. If the binding energy is more than the energy of the photon, a photoelectric interaction cannot occur. This interaction is possible only when the photon has sufficient energy to overcome the binding energy and remove the electron from the atom.

The photon's energy is divided into two parts by the interaction. A portion of the energy is used to overcome the electron's binding energy and to remove it from the atom. The remaining energy is transferred to the electron as kinetic energy and is deposited near the interaction site. Since the interaction creates a vacancy in one of the electron shells, typically the K or L, an electron moves down to fill in. The drop in energy of the filling electron often produces a characteristic x-ray photon. The energy of the characteristic radiation depends on the binding energy of the electrons involved. Characteristic radiation initiated by an incoming photon is referred to as fluorescent radiation. Fluorescence, in general, is a process in which some of the energy of a photon is used to create a second photon of less energy. This process sometimes converts x-rays into light photons. Whether the fluorescent radiation is in the form of light or x-rays depends on the binding energy levels in the absorbing material.

▪▪

Read carefully the text above and answer the questions below:

1- Give the equivalent in Arabic of the terms listed below: **(10 pts)**

The photon's energy = طاقة الفوتون	Fluorescence= الفلورة
overcome = التغلب	Characteristic radiation = الإشعاع المميز
Photoelectric = الكهروضوئي	tiny particles = الجزيئات الصغيرة
sufficient energy = الطاقة الكافية (اللازمة)	powerful = قوي
a vacancy = شاغر (غير مشغول)	the behaviour = السلوك

2- Translate to the **English** the below paragraph: **(6 pts)**

في عام 1905, كتب البرت أينشتاين أول ورقة له عن النسبية الخاصة. فيها, اثبت ان الضوء يسافر بالسرعة نفسها بغض النظر عن السرعة التي يتحرك بها المراقب. حتى باستخدام القياسات الأكثر دقة ممكنة , تبقى سرعة الضوء هي نفسها بالنسبة للمراقب الذي لا يزال قائما على سطح الأرض كما هو الحال بالنسبة للذي يسافر على ارتفاع من سطحها في طائرة ذات سرعة فوق الصوتية. بطريقة مماثلة, و على الرغم من ان الأرض تدور حول الشمس و التي تتحرك حول مجرة درب التبانة و هي عبارة عن مجرة تسير عبر الفضاء, فان سرعة الضوء التي يتم قياسها من الشمس سوف تكون هي نفسها سواء أكان شخص داخل أو خارج المجرة لحسابها .حسابات أينشتاين تقول ان سرعة الضوء لا تتغير مع الزمان أو المكان.

In 1905, Albert Einstein wrote his first paper on special relativity. In it, he established that light travels at the same speed no matter how fast the observer moves. Even using the most precise measurements possible, the speed of light remains the same for an observer standing still on the face of the Earth as it does for one traveling in a supersonic jet above its surface. Similarly, even though Earth is orbiting the sun, which is itself moving around the Milky Way, which is a galaxy traveling through space, the measured speed of light coming from our sun would be the same whether one stood inside or outside of the galaxy to calculate it. Einstein calculated that the speed of light doesn't vary with time or place.

3- Translate to the **Arabic** the below paragraph: (4 pts)

What is Entropy?
The entropy is a thermodynamic quantity whose value depends on the physical state or condition of a system. In other words, it is a thermodynamic function used to measure the randomness or disorder of a system.
For example, the entropy of a solid, where the particles are not free to move, is less than the entropy of a gas, where the particles will fill the container.

الانتروبيا هي كمية ديناميكية حرارية تعتمد قيمتها على الحالة الفيزيائية أو حالة النظام. بمعنى آخر ، إنها وظيفة ديناميكية حرارية تستخدم لقياس عشوائية أو اضطراب النظام.

على سبيل المثال ، إنتروبيا المادة الصلبة ، حيث لا تكون الجسيمات حرة في الحركة ، أقل من إنتروبيا الغاز ، حيث تملأ الجسيمات الحيز.