Maxwell's theory of electromagnetism

In the mid 1800s Michael Faraday performed many ground breaking experiments in the area of electricity and magnetism. He believed there was an intimate connection between the two and his experiments bore that out. He also believed that light was related as well. His experiment showing that the polarization of light passing through a medium (quartz) was changed by the presence of a strong magnetic field (now called the Faraday rotation) convinced him he was on the right track. However, Faraday was not an experienced theorist and could develop a theory to further his conviction. In the 1860s another British scientist James Clerk Maxwell took up Faraday's cause. Maxwell was an experienced theorist (probably one of the top physicists ever) and developed the mathematical theory into one of the pinnacles of modern physics. Maxwell's theory of electromagnetism was quickly hailed as a major advancement in human knowledge. In his theory, he formally unified electric and magnetic phenomena and in the process posited a new phenomena, electromagnetic waves. The mathematics stipulated that these waves travel at a speed of approximately 3 _ 108m s which he knew was close to the speed of light. He hypothesized that this new entity was actually light. His idea was experimentally verified about 20 years later by Heinrich Hertz.

Maxwell's theory unified not only electrical and magnetic phenomena but also optics. It was understood later that other phenomena, radio waves, X rays, gamma rays, microwaves, infrared and ultraviolet radiation all were electro-magnetic waves. Maxwell's work was immediately hailed as a success and has withstood the test of time by not being modified in the 150 years of its existence. For within his theory the budding elements of special relativity were built in, i.e. Maxwell's theory is a special relativistic theory of electromagnetic radiation. Even though the later quantum theory would change the view of light is, Maxwell's equations are still valid within it.

Reading comprehension: 6.5

1. Title of the text: Maxwell's theory of electromagnetism. 1

2.

- **True 1**
- **True 1**

3. Relationship=connection 0.5
Gathered= unified 0.5
Mentioned=stipulated 0.5
Achievement=success 0.5
Suggested=hypothesized 0.5

4. although/ despite ….. 1

SCIENCE AND TECHNIQUES PREPARATORY SCHOOL OF ORAN

SECOND WRITTEN TEST **2ND YEAR/ April-12**

Exercise 1: 5

Example:

Th chlorophyll, CO2 is ***transformed into*** *oxygen,* (because of)

-> Thanks to *chlorophyll, CO2 is transformed into oxygen.*

1. A superficial interpretation of statistics may leads to erroneous conclusions, *(have as a consequence)*
2. The airports are being enlarged, thus/therefore we can expect an increase in the tourist industry, *(consequently)*
3. due to rising temperatures, the average thickness of polar ice is only half as much as it was 10 years ago. *(because of)*
4. New data supplied by the human genome project is going to spark off a revolution in medical research, *(cause, start)*
5. In statistics, when the number of possible outcome is 0, it indicates that an event will never occur, *(consequences, results)*
6. The accident resulted in two deaths from multiple organ failure, *(had as a consequence)*
7. Lake Geneva is becoming severely deoxygenated during the summer months owing to the hydroelectric dams built in the upper Rhone, *(because of)*
8. The C02 produced in respiration is a by-product of metabolism, *(collateral,secondary result)*
9. In surgical operations, serum rather than plasma is often used since it is more readily available, *(because)*
10. New York City has spent $10 million on mosquito control, thereby reducing viral health risks to the population, *(by doing this, thus)*

Exercise 2 :Link the two halves of the sentences together 2.5

1. It must be six o'clock. No, **actually ...**	a. it begins to melt.
2. If you heat copper to 400°C, it becomes viscous, **in other words ...**	b. they float on water.
	c. it should be handled with care.
3. The current was too high, **as a result ...**	d. they should be kept away from children.
4. Mercury is a metal, **nevertheless ...**	e. it does not do so if you add salt.
5. Amphetamines are dangerous, **therefore ...**	f. the wires began to overheat.
6. As a rule, water freezes at 0°C, but ...	g. it consumed too much fuel.
7. Glass is fragile, thus ...	h. it is a fluid.
8. The motor was out of date, **besides ...**	i. at higher altitudes, the temperature is lower.
9. Hydrocarbons are relatively light, **in fact...**	j. it is five past six.
10. Water usually boils at 100°C, **however ...**	

1 . / J * 2 . / a * 3 . / f * 4 . / h * 5 / d * 6 . /e* 7/c * 8 . /g * 9 . /b * 10./i

Exercise3: Match the meaning of the verb with the definition and then write in the correct particle for each verb: IN • OF • UP • OUT • FOR • ON. 3.5

1. When visibility is reduced, airports **rely on** radar control.
2. In 1830, Babbage designed a machine to **carry out** complex arithmetical calculations.
3. A protein may **consist of** several polypeptide chains held together by weak molecular bonds.
4. In 1937, four Soviet scientists **set up** temporary scientific stations on drifting icebergs in the Arctic.
5. Chemists can **work out** the number of carbon atoms from the weight of the object growth of body hair, and changes in the larynx.
6. It is the ability to use the Sun and the stars to navigate which **accounts for** the migration of birds.
7. The level of pH **depends on** the strength of the acid

Exercise 4: 2.5