Class: 3rd Secondary (Humanities) | **Final Exam** | **Points:** 20
Subject: Biology | **Duration:** 60 min.

Question I: **2pts**

Correct if necessary the false statements

a. As BMI increases the risk of obesity decreases.
b. LDL takes the cholesterol from cells and stores it in the liver.
c. Substance P is released when enkaphaline binds on the receptor of pre syaptic neurons
d. Myelin sheath accelerates the propagation of nervous messages in a nerve fiber.

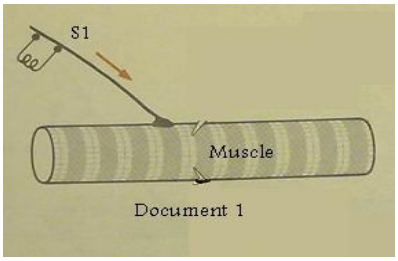
Question II: Omega 3 Fatty Acids **6pts**

Essential Fatty Acids (EFAs) are fats that are essential for our body but the body cannot synthesize them. These fats are classified as essential because they manufacture and repair cell membranes and expel harmful waste products. They produce prostaglandins, which regulate several physiological functions including blood pressure, heart rate, blood clotting and immune function. If we do not get these essential fats, then we may get many health problems. Essential Fatty Acids are polyunsaturated fatty acids. There are two families of EFAs: omega 3 fatty acid and omega 6 fatty acid. There is a third one, omega 9 fatty acid, but as our body can manufacture it in adequate amount, it is not in EFA category. The symptoms of omega 3 fatty acid deficiency are dry and itchy skin, brittle nails and hair, constipation, frequent colds, depression, cardiovascular disease, type 2 diabetes, accelerated aging, fatigue inability to concentrate and joint pain. However, these symptoms may be due to some other health conditions or nutrient deficiencies. Hence it is difficult to know whether a person is having an omega 3 deficiency. As our body is unable to manufacture omega 3 and omega 6 fatty acids, we should eat foods containing these fatty acids. The dietary sources of omega 3 and omega 6 fatty acids are : Flax oil, flax seeds, hemp seed oil, pumpkin seeds, walnuts & walnut oil, soybeans & soybean oil, dark green leafy vegetables like seaweed, broccoli, mustard greens, spinach and kale, spring greens, dark salad leaves, cabbage, Brussels sprouts & parsley, and salmon fish. Omega 3 fatty acids are polyunsaturated. All polyunsaturated oils are highly susceptible to damage from heat, light and oxygen. When exposed to these elements for too long, the fatty acids are oxidized producing free radicals, which are believed to promote cancer and other degenerative diseases. The omega 3 oils should be used for dressings and not for deep frying.

Pick up from the text:
1- Why it is important to consume omega 3 fatty acids?
2- Can we consider a fried food (with omega 3 oil) as a good source for omega 3 fatty acids? Justify your answer.
3- Can we know that we have omega 3 deficiency symptoms?
4- Is it necessary to have supplements of omega 3 fatty acids? Justify your answer By referring to your acquired knowledge.

Question III: Acetylcholine (Ach) and Synapse **6pts**

A number of experiments are done at the level of a motor neuron and muscle as seen in the next setup document 1.
The results of these experiments are summarized in this table of doc.2:

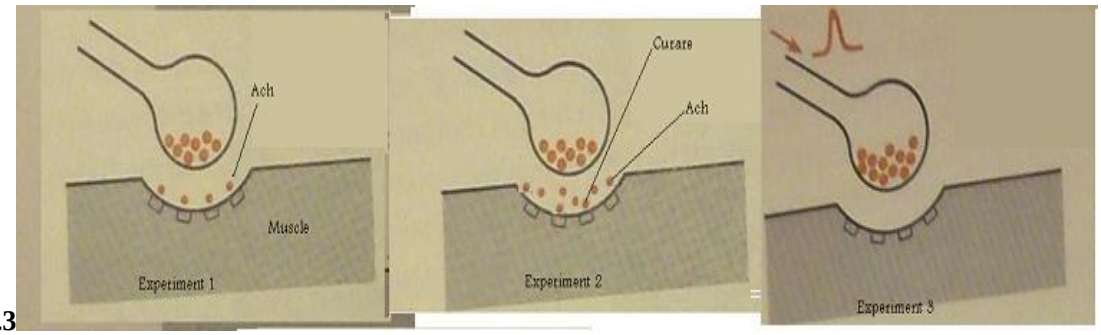


Doc.2

No of experiments	Stimulation	Ach released at synaptic cleft	Response of muscle
Experiment 1	Stimulation at S1	Ach released	Contraction
Experiment 2	Stimulation at S1 after adding curare at the Synaptic cleft	Ach is released	No contraction
Experiment 3	Stimulation at S1 but after injecting the neuron with Boutilium poison	Ach is not released	No contraction

1. Interpret the three experiments.
2. What hypothesis you can predict concerning the action of curare and Boutilium?

To understand the action of curare and Boutilium toxins, the following documents(doc.3) show the synapse at the level of each experiment.

Doc.3 

3. Are your hypothesis validated? Justify your answer by explaining the above results.
4. Identify the type of this synapse?

<u>Question IV</u>: Magnesium 6pts

Magnesium plays important roles in the structure and the function of the human body. The adult human body contains about 25 grams of magnesium. Over 60% of all the magnesium in the body is found in the skeleton, about 27% is found in muscle, 6% to 7% is found in other cells, and less than 1% is found outside of cells. Magnesium is involved in more than 300 essential metabolic reactions as well as structural role in building up bones, chromosomes, and membranes. Also Mg decreases coronary heart diseases, hypertension and severity of migraine headaches. It is mainly found in oat, Bran cereals, and almond.

The recommended dietary allowance of Magnesium (RDA) had recorded the following results:

Recommended Dietary Allowance (RDA) for Magnesium			
Life Stage	**Age**	**Males (mg/day)**	**Females (mg/day)**
Infants	0-6 months	30 (AI)	30 (AI)
Infants	7-12 months	75 (AI)	75 (AI)
Children	1-3 years	80	80
Children	4-8 years	130	130
Children	9-13 years	240	240
Adolescents	14-18 years	410	360
Adults	19-30 years	400	310
Adults	31 years and older	420	320
Pregnancy	18 years and younger	-	400
Pregnancy	19-30 years	-	350
Pregnancy	31 years and older	-	360
Breast-feeding	18 years and younger	-	360
Breast-feeding	19-30 years	-	310
Breast-feeding	31 years and older	-	320

1. Draw a histogram showing the (RDA) of Mg **among males only** according to their age.
2. What information does this table reveal concerning magnesium need?
3. Knowing that Mg decreases coronary heart diseases, mention three factors that increase heart disease.
4. Why males need more magnesium than females.

Good Work