

Answer all of the following questions:

Question I (3 pts.)

Correct the following expressions

- A- In an excitatory synapse, the binding between the neurotransmitter and the receptor increases the polarity of the post synaptic membrane.
- b- Cholesterol present in the body comes only from food.
- c- An essential substance can be synthesized by an organism.

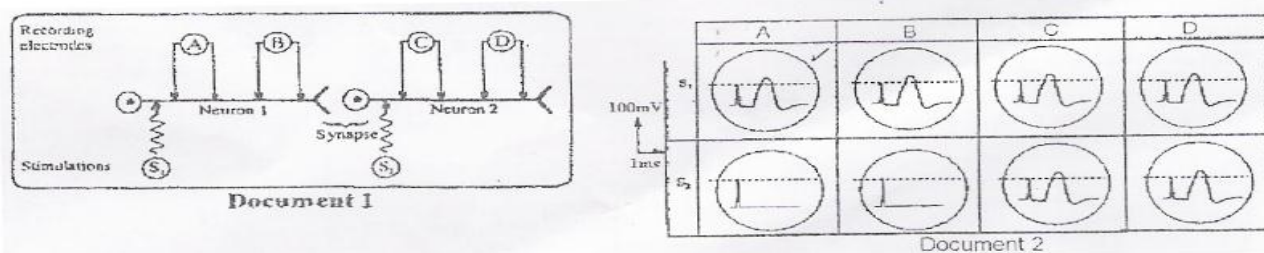
Question II (5 pts.)

The major stimulants drugs are amphetamines and related compounds, methylxanthines (methylated purins), cocaine, and nicotine. Amphetamines achieve their effect by increasing the amount and activity of the neurotransmitter norepinephrine (noradrenaline) within the brain. They facilitate the release of norepinephrine by nerve cells and interfere with the cell's reuptake and break down of the chemicals, thereby increasing the availability within the brain. Their heavy or prolonged use cause irritability, restlessness, hyperactivity, anxiety, excessive speech, and rapid mood swing. Still higher doses or chronic use can cause agitation, tremors, confusion, and, in the most serious cases, a state resembling paranoid schizophrenia. With repeated use, tolerance develops, so that a user needs to take larger doses, but the accompanying dependence is not strong enough to be termed a physical addiction. Amphetamines are widely abused, in some cases by workers or students seeking enhanced physical energy and mental acuity to fulfill demanding tasks.

- a- Pick up from the text:
 - 1- The effects of prolonged use of amphetamines.
 - 2- The reason why some people may cause this drug.
- b- Based on the above text, draw a functional diagram to explain the stimulatory effect of amphetamines.

Question III (6.5 pts.)

A- Effective stimuli, S1 and S2 are applied to two neurons linked by a synapse (document 1). Document 2 shows the recording of the obtained action potentials.



- a- Compare the recording obtained due to stimulations S1 and S2.
- b- What property of synaptic transmission is revealed by this experiment?

c- By referring to document 2, what do the different parts of the recording shown oscilloscope A after stimulation S1 represent? Give ionic interpretation when necessary.

B- Many stimulations of increasing intensities are applied on a nerve and a nerve fiber whose responses R1 and R2 (action potential) are represented in the next table.

Intensity of stimulation	I1	I2	I3	I4	I5	I6	I7	I8
R1((in mv)	0	0	50	60	80	100	200	200
R2 (in mv)	0	0	50	50	50	50	50	50

a- Construct the curves of variations of the action potential of the nerve and the nerve fiber as a function of the intensity of stimulation. Take 1 cm as the space between consecutive intensities.

b- Analyze the obtained results and deduce to what does each of R1 and R2 correspond?

Question IV (5.5 pts.)

Kwashiorkor, also called Protein Malnutrition, condition caused by severe protein deficiency. Protein malnutrition is most often encountered in tropical and subtropical regions in which the diet is high in starch and low in proteins. Kwashiorkor is common in young children weaned to a diet consisting chiefly of cereal grains, cassava plantain, and sweet potato or similar starch food.

The condition in children was first described in 1932 and was termed Kwashiorkor,, meaning “deposed from the mother’s breast by a new born sibling) in one African dialect and “red boy” in another dialect. The latter term comes from the reddish orange discoloration of the hair that is a characteristic of the disease. Other symptoms include dry skin and skin rash, potbelly and edema, weakness and nervous irritability, and digestive disturbance with diarrhea, anemia, and fatty infiltration of the liver.

Document 1 shows the different amino acids liberated by the hydrolysis of 1000g of proteins

Amino acids	Leucine	Isoleucine	Lysine	Methionine	Phenylalanine	Threonine	Tryptophane	Valine
Milk proteins (in g)	9.2	6.1	8.2	3.4	5	1.9	1.2	7.2
Manioc (in g)	2.9	2	3.5	1	2.2	2.1	0.5	2.6

a- pick up from the text

1- The definition of Kwashiorkor.

2-The symptoms of this disease.

b- According to the information given, deduce the cause of this disease.

Good Work