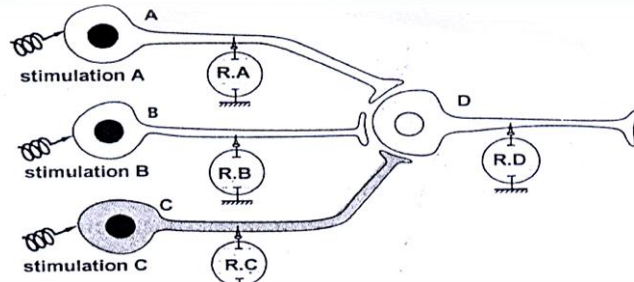


**Exercise I: Nervous transmission**

**(8 pts.)**

A) Synapses are known as excitatory and inhibitory .In system of 4 interconnected neurons; A, B, C, and D, we studied the response of neuron D as a result of the stimulation of the neurons A, B, C, and D



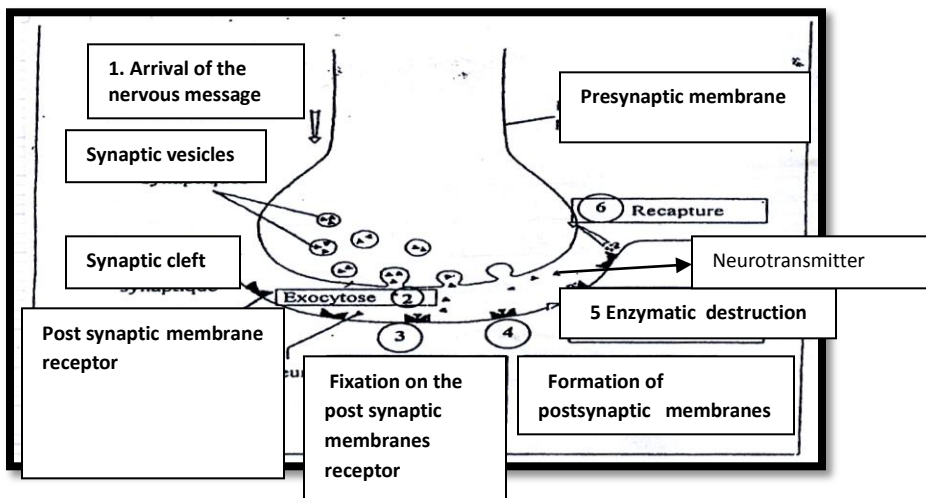
The table below gives the response of the four neurons affected by the stimulation:

	Response A	Response B	Response C	Response D
Stimulation A	+	-	-	+
Stimulation B	-	+	-	+
Stimulation C	-	-	+	-
Stimulation (A+ C)	+	-	+	-
Stimulation (A +B+C)	+	+	+	+

+: presence; -absence

**1-Interpret the result of each experiment and deduce the property of neuron D.**

B) The document below represents the steps of synaptic transmission between A and D.

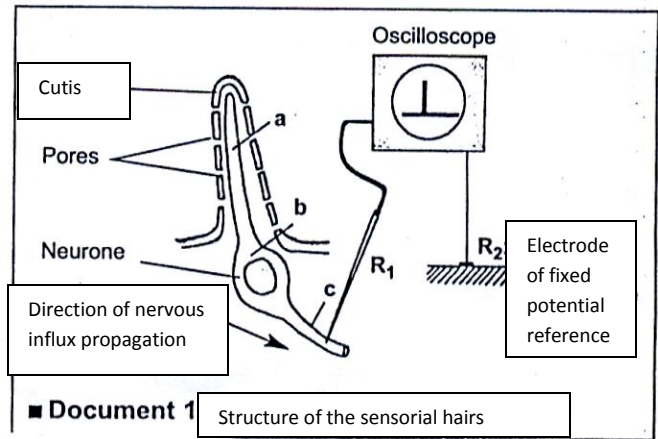


- Write a short text that summarises the different steps of the synaptic transmission.

**Exercise II:**

**(6 pts.)**

In the night butterfly, the Bombyx of mulberry tree, the female secret a volatile substance called the Bombycol. The male detects the presence of bombycol by the antennal nerve. This antenna holds approximately 20,000 sensory hairs. A longitudinal section of a sensory hair is schematized in document: 1



1- What are the elements a, b, c of the neuron schematize in the sensory hair in document 1?

By means of an oscilloscope we can record the electrical activity of neuron when at time  $t_0$  a rod immersed in a solution of bombycol of different concentration (document: 2)

Concentration of bombycol in  $\mu\text{g}$  per unite of volume



Document 2: obtained results

2- Represent in a table the variation of number of A.P (action potential) in function of concentration of Bombycol (in  $\mu\text{g}$  by unit of volume)

3- Analyze the results of document 2 and deduce the coding form of nervous message

**Exercise III: Parkinson disease**

**(6 pts.)**

“Parkinson disease is one of the neurodegenerative diseases that are well known like other pathologies of this kind. It is known by its progressive slow destruction of certain neurons of the brain in the black substance. These neurons extend prolongations connected to a sub cortical region, the striatum used to control motor activities. The neurons of the black substance release a chemical messenger, the dopamine. As those neurons die, less and less dopamine reaches the striatum which results in symptoms known for the disease such as muscular rigidity and impossibility of slowing down of movements.

- 1- Pick-up from the text, the causes of this disease?
- 2- Complete the following concept map that summarize the mechanism in the normal person

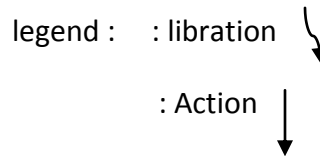
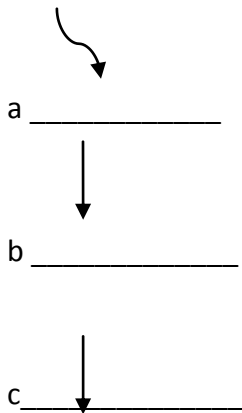
:

Normal person

Cerebral trunk

Black substance

Neuron



- b- Make a concept map to present the same mechanism with an infected person

(to specify if necessary, use the utilized legend)