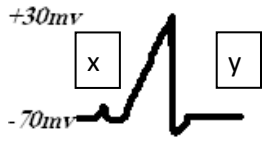
Class: 3 rd. Secondary (Humanities) | **First Unified Exam** | **Points:** 20 pts.
Subject: Biology | **Duration:** 150 min.

Exercice I: Role of a receptor (11pts)

The skin has many sensory corpuscles, each type responds to a specific stimulus. One receptor called Krause corpuscle is isolated, then a microelectrode is placed on its nerve fiber, and this microelectrode is connected to an oscilloscope, two experiments are realized.

Experiment 1: In order to identify its specific stimulus, different types of stimulations are applied on Krause corpuscle, the following registrations are obtained (document 1).

	Experiments	Obtained registrations
A	Appling a hot needle	-70mv_____
B	Appling a cold needle	
C	Appling an electric stimulation	-70mv_____

Document 1 : Results of stimulations

1- **Analyze** these experiments of document 1 and **deduce** the type of stimulus in which the Krause corpuscle reacts. (3pts)

2- By referring to your acquired knowledge, **name** the phases x and y of the registration B and **give an ionic explanation** of each phase. (2pts)

Experiment 2: Krause corpuscle is placed under different temperatures and the following registrations are obtained.

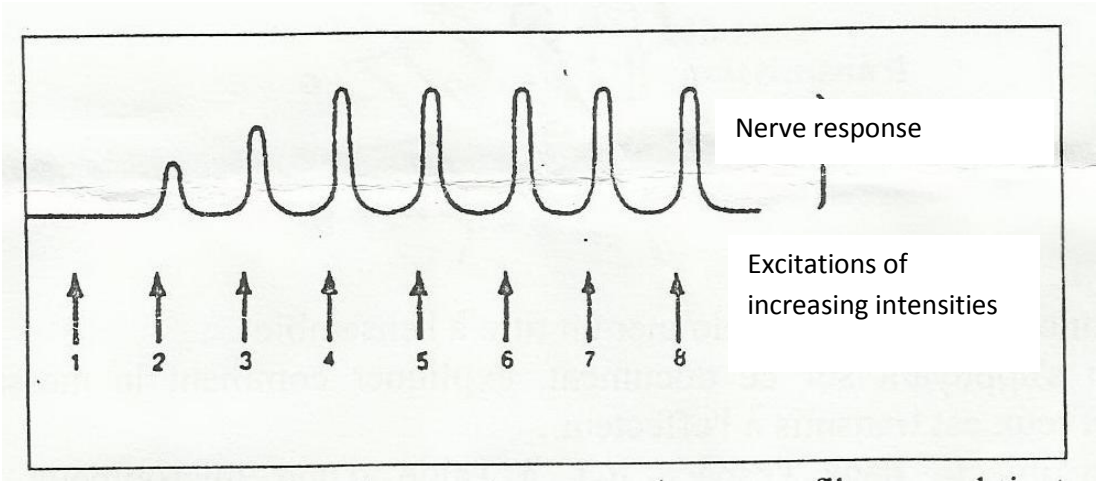
3- **Represent in a table** the variation of the frequency of action potential with function of temperature. (3pts)

4- **Interpret** this experiment, what can you deduce concerning the coding of the intensity of stimulation? (3pts)

Temperature	AP
-6°c	IIIIIII
-4°c	IIIII
-2°c	III
0°c	II

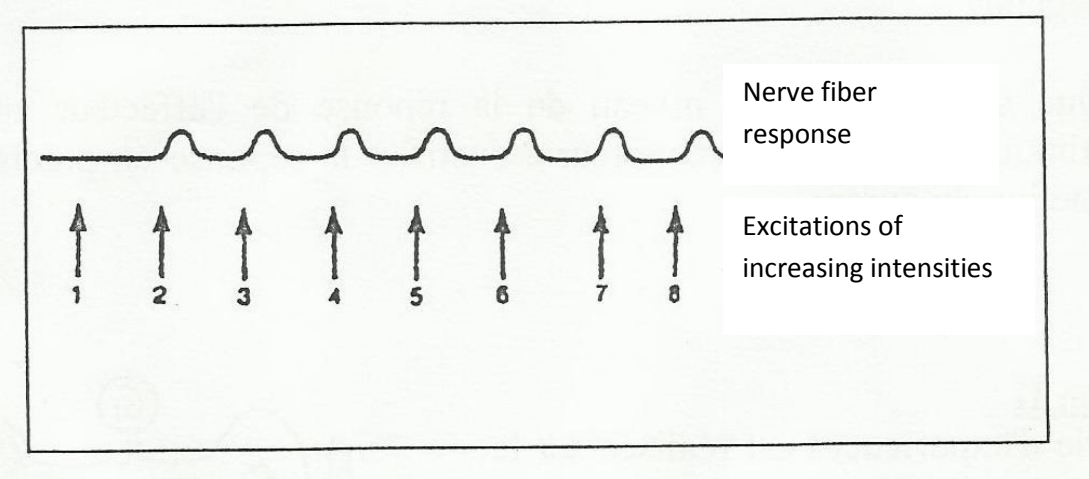
Exercice II: AP in nerve and nerve fiber (4pts)

Excitations of increasing intensities are applied on a nerve. The results are registered and presented in document 1.



Document 1 : Result in a nerve

The same experiment is done on a nerve fiber, the results are in document 2.



Document 2 : Results in a nerve fiber

1- **Analyze** the results of documents 1 and 2. **What can you deduce** concerning the properties of nerve and nerve fiber ? (4pts)

<u>Exercice III</u>: Disease of the central nervous, SCHIZOPHRENIA (5PTS)

(from grec, *schizein* : separate and *phren* : mind)

It is a chronic disease characterized by serious aberrations of the logical structure of thinking. This disease is the synonyme of madness.

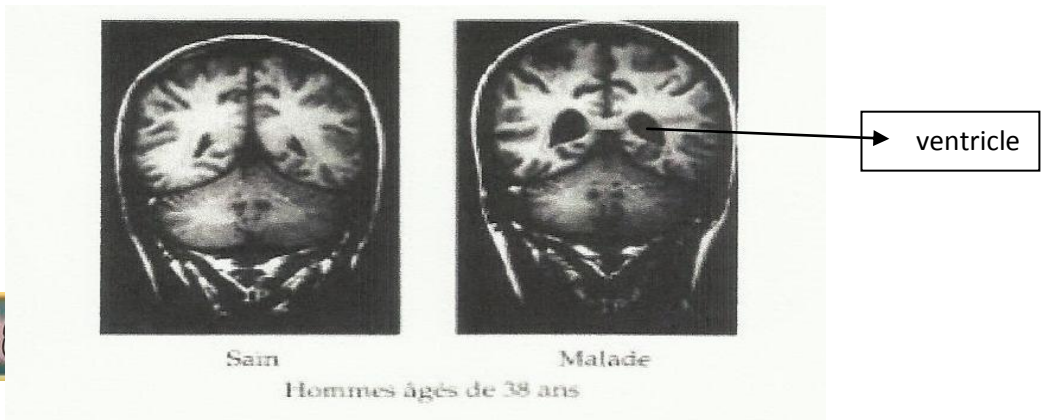
Rather than the well known auditive hallucinations, the schizophrenia is marked by deliriums, an important fatigue, strange position and movements and depressive changements.

The reasons of the schizophrenia are certainly bound to a set of genetic and environmental factors: Among these, problems at the time of pregnancy (bleeding) or of the childbirth (respiratory difficulties), of the negative stress as positives (happy) or the use of drug. the neuroleptic chlorpromazine (Largactyl), halopéridol (Haldol) and their derivatives are used to treat this illness.

Pick up from the text: (3pts)

1- The symptoms of the disease.
2- The causes of the disease.
3- Treatment of the disease.

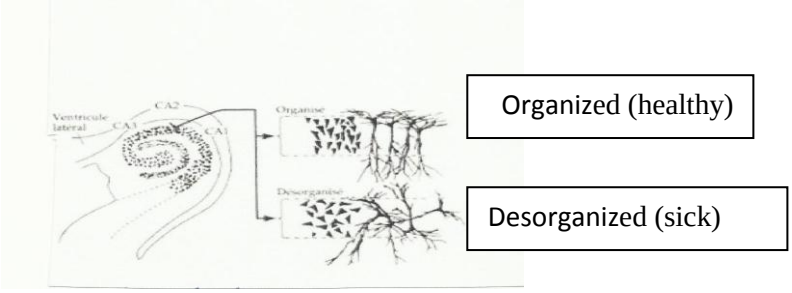
At the anatomic level, we observed, by using different methods (microscope, tomography, MRI), the difference between a healthy individual and a sick one.



healthy sick

Man of 38 years old

Doc1 : represents the ventricules



Doc2 : represents the pyramidal neurons

4- Make a comparative table showing the differences between a healthy person and a shizophrenian individual concerning the ventricles and the pyramidal neurons. (2pts)

Good Work!