

دورة سنة 2009 الإستثنائية	الشهادة المتوسطة	وزارة التربية والتعليم العالي المديرية العامة للتربية دائرة الامتحانات
الاسم: الرقم:	مسابقة في مادة علوم الحياة والأرض المدة: ساعة واحدة	

Answer the four following exercises:

### Exercise I (5 points)

#### Cardiac activity

Indicate the true expressions and correct the false ones.

- 1- During ventricular systole, blood is pumped from the ventricles into the veins.
- 2- Auricular systole is the simultaneous contraction of both auricles.
- 3- During diastole, auricles and ventricles contract.
- 4- During auricular systole, the tricuspid and bicuspid valves are closed.
- 5- Valves prevent the back flow of blood.

### Exercise II (5 points)

#### Transmission of an autosomal hereditary trait in humans

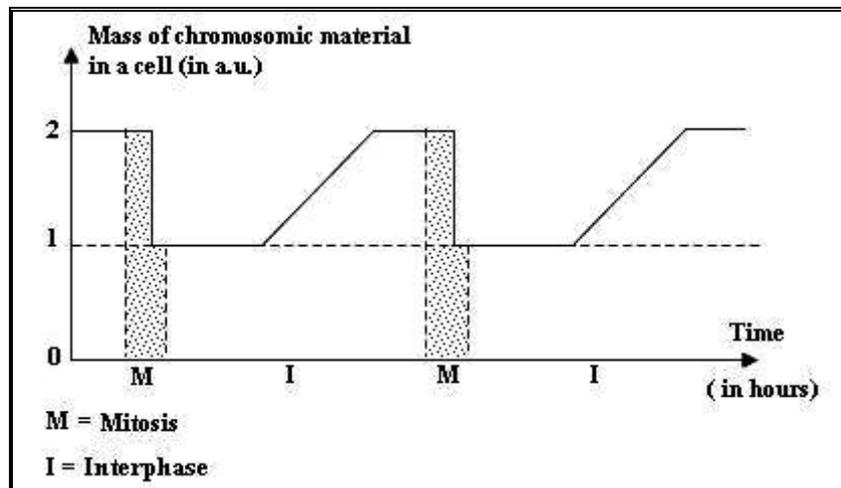
In human species, the allele responsible for myopia is dominant over the allele responsible for normal vision.

- 1- Designate, by symbols, the corresponding alleles.
- 2- a- Write the genotype of a person with normal vision. Justify the answer.  
b- Write the possible genotypes of a myopic person. Justify the answer.
- 3- A heterozygous myopic man marries a woman with normal vision.  
Make a factorial analysis to determine the genotypic proportions of their children.

### Exercise III (5 points)

#### Cell cycle

The **document** below represents the variation in the mass of chromosomic material during a cell cycle : interphase – mitosis.



- 1- **a-** How does the mass of the chromosomic material vary during interphase and during mitosis?  
**b-** Derive the importance of interphase.
- 2- Schematize a chromosome and label its parts :  
**a-** at the beginning of interphase,  
**b-** at the end of interphase.
- 3- Name the mitotic phase through which the mass of the chromosomic material in the cell becomes equal to 1 a.u.

### Exercise IV (5 points)

#### Effect of temperature on the enzymatic activity

To determine the effect of temperature on the enzymatic activity, we place five test tubes containing the same quantity of cooked starch and the same enzyme : salivary amylase, at different temperatures.

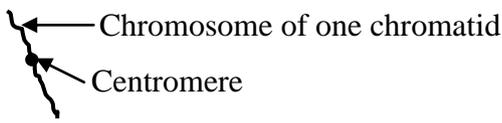
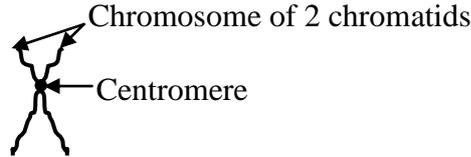
Fifteen minutes later, we measure the activity of this enzyme in each of these test tubes. The measured results are shown in the opposite **table**.

Table showing the variation of the enzymatic activity in function of temperature					
Temperature (in °C)	0	20	37	45	60
Enzymatic activity (in %)	0	20	100	15	0

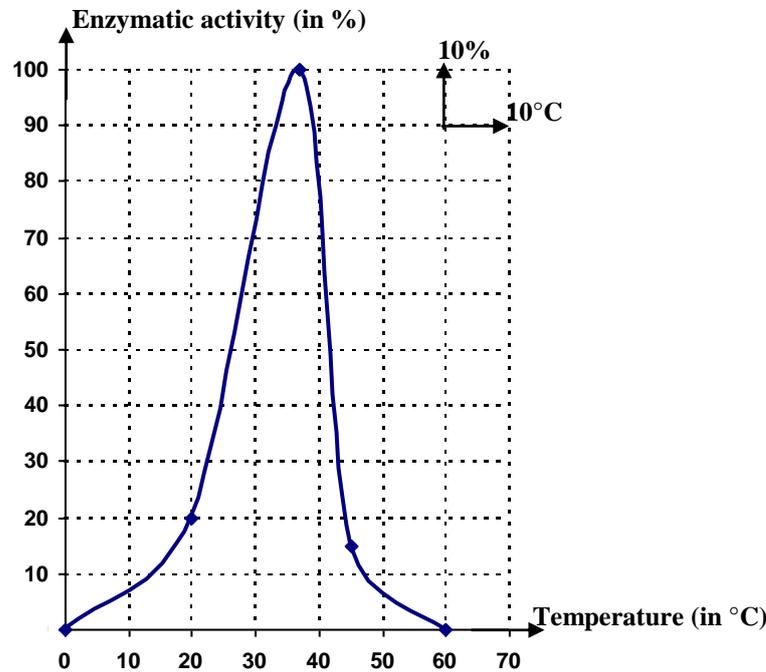
- 1- Draw a graph showing the variation of the enzymatic activity in function of temperature.
- 2- Analyze the obtained results, above **table**.  
 - Draw out a conclusion concerning the property of the enzyme.  
 The test tube that was placed at 60°C, is placed at 37°C.
- 3- Will the enzymatic activity, in this case, be changed ? justify the answer.



### Exercise III (5 points)

Part of the Q	Answer	Mark
1-a	During interphase, the mass of chromosomic material increases from 1 a.u. to 2 a.u. (or it doubles). During mitosis, the mass of chromosomic material decreases from 2 a.u to 1a.u.	1.5
1-b	Interphase allows the duplication of the chromosomic material.	1
2-a	 <p>Chromosome of one chromatid Centromere</p> <p>Schema of the chromosome at the beginning of interphase.</p>	1
2-b	 <p>Chromosome of 2 chromatids Centromere</p> <p>Schema of the chromosome at the end of interphase.</p>	1
3	Anaphase	0.5

### Exercise IV (5 points)

Part of the Q	Answer	Mark
1	 <p><b>Title :</b> Graph showing the variation of the enzymatic activity in function of temperature</p>	2
2	At 0°C, the enzymatic activity is nil. This activity increases rapidly with the increase of temperature and reaches a maximal value of 100% at 37°C. Then, it decreases rapidly and becomes nil at 60°C. Therefore, the enzyme has maximal activity at a convenient temperature (37°C).	2
3	No, because the enzyme is destroyed at 60°C.	1

