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المسالك الدولية - خيار أنجليزية
الدورة الاستدراكية 2017
- عناصر الإجابة -

RR 34E

المملكة المغربية
وزارة التربية الوطنية والتكوين المهني والتعليم العالي والبحث العلمي

المركز الوطني للتقويم والامتحانات والتوجيه

المادة	علوم الحياة والارض	مدة الإنجاز	3
الشعبة أو المسلك	مسلك العلوم الفيزيائية – خيار أنجليزية	المعامل	5

Key and Marking Scale

Section I : Knowledge Retrieval (5 pts)		
	Questions	**Scores**
I	***Accept any appropriate answers.*** **Ophiolite:** is part of ancient Oceanic crust present nowadays at the continental margin. (*Accept the definition of complex ophiolite*)…… **Foliated texture :** is a structure of the metamorphic rocks characterised by the alternation of clear and dark bands (the mineral constituents of foliated metamorphic rocks are in parallel arrangement)	**0.5 pt** **0.5 pt**
II	**The three structural and petrographic characteristics of obduction mountain chains are:**…… (3×0.25pt) - presence of the ophiolite. - presence of the rock deformation complex(thrust fault/thrust sheets/nappes) - presence of the oceanic/marine sediments.	**0.75 pt**
III	(1,c) ; (2,b) ; (3,b) ; (4,d) ……...….(4×0.5pt)	**2 pts**
IV	**The appropriate name for each figure:** Figure 1 : Overturned fold; Figure 2 : Recumbent fold ; Figure 3 : Thrust fault ; Figure 4 : Normal fault ; Figure 5 : Reverse fault.	**1.25 pt**
Section II : Scientific reasoning and communication in graphic and written modes (15 pts)		
Questions	**Exercise 1 (5 pts)**	**Scores**
1.a	- free style swimming 100 metres (1mn): important decrease in the phosphocreatine concentration, increase in lactic acid concentration and a low decrease of glycogene concentration …….. -free style swimming 1500 metres (15min): important decrease in glycogene concentration, a slight increase in lactic acid concentration and low decrease in the phosphocreatine concentration.	**0. 5 pt** **0. 5 pt**
1.b	**metabolic pathway in the muscle:** - For the 100 meters swimmer free style : there is a dominance of phosphocreatine consumption (85%), and use of the lactic fermentation(10%) and glucose consumption (5%) to produce ATP…… For the1500 meters swimmer free style: we observe a dominance of the aerobic pathway (95%), and the muscle uses the anaerobic pathway (lactic fermentation) (5%) to produce ATP.	**0. 5 pt** **0. 5 pt**
2	**-document 3:** flowing a training of long duration, we observe an increase in the number and size of mitochondria and an increase in Krebs cycle enzyme activity……....	**0.25 pt**

	-document 4 : an increase in the swimming speed is accompanied by an enormous increase in lactic acid concentration. We notice that this lactic acid concentration is less in the trained swimmer's muscles……	**0.25 pt**
	Explanation : During muscular effort of long duration (swimming for 1500 meters), the muscle favors the aerobic metabolism (respiration) compared to anaerobic metabolism (lactic fermentation) due to an increase in the number and size of mitochondria and an increase in Krebs cycle enzyme activity.	**0.5 pt**
3	- The EPO consumption increases the number of red blood cells and hemoglobin quantity →increase in the muscle oxygenation → increase in ATP production through aerobic pathway (respiration)…… - The consumption of the creatine gives the muscle an additional ATP quantity.	**0.75 pt** **0.25 pt**
4	Regular training allows an increase in the number and size of mitochondria and an increase in Krebs cycle enzyme activity. Training in a mountainous region increases the number red blood cells and the hemoglobin quantity (same effect of EPO); it also improves the pulmonary ventilation, which increases the ATP production in the muscle through aerobic pathway (respiration). This proves that the sporting performance without using EPO is possible.	**1 pt**
questions	**Exercise 2 (3 pts)**	**scores**
1	- Transfer of a seedling fava bean from a normal culture medium to a radioactive culture medium (rich in radioactive thymidine)→insertion of radioactive thymidine in DNA during its replication→ obtaining a DNA molecule having a radioactive strand→ the two chromatids of metaphase chromosomes become radioactive……	**0.25 pt**
	Transfer of this seedling in a non-radioactive culture medium during a cellular cycle→ insertion of non-radioactive thymidine in DNA during its replication….. → obtaining two types of DNA molecules: one type has one radioactive strand and the other has two non-radioactive strands→ one of the two chromatids of each metaphase chromosome is radioactive…….. Drawing an appropriate scheme of DNA replication: ……...	**0.25 pt** **0.5 pt** **0.5 pt**
2	**Amino acid sequence corresponding to a part of the gene that codes the ERCC3 protein synthesis:** mRNA : CCA ACU UGU GAU AAC UGC ……... **Amino acid sequence:** Pro – Thr – Cys – Asp – Asn – Cys …….. **Amino acid sequence corresponding to a part of the gene that codes the ERCC3 protein synthesis in the individual affected with XPB.** mRNA : CCA AUU GUG AUA ACU GCA ……. **Amino acid sequence:** Pro – Ile – Val – Ile – Thr – Ala ……. **Explanation :** Mutation at the level of 67 triplet by deletion of G nucleotide in the transcribed strand of DNA (Deletion of C nucleotide in the untranscribed DNA strand) → synthesis of the inefficient ERCC3 protein → ERCC3 not capable of repairing errors at the DNA level → the appearance of the disease.	**0.25 pt** **0.25 pt** **0.25 pt** **0.25 pt** **0.5 pt**

questions	Exercise 3 (2 pts)	scores
1	**Exploitation of the results of the first and second crosses :** - dihybrid cross : study of the transmission of two hereditary traits. …… + the gene coding the plumage colour is sex linked (X chromosome), and the gene controlling the colour of eyes is not linked to sex……... + the two genes are independent……. +the allele responsible for the blue plumage is dominant (B) and the allele responsible for the brown plumage is recessive (b), and the allele responsible for the black eyes is dominant (N) and the allele responsible for the orange eyes is recessive (n).	**0.25 pt** **0.25 pt** **0.25 pt** **0.25 pt**
2	**Interpretation of the first cross:** Parents : male × female Phenotype : [NB] [nb] Genotype : N//n ; X_BX_b n//n ; X_b Y 25% N/X_B ; 25% N/X_b 50% n/Y ; 50% n/X_b 25% n/X_B ; 25% n/X_b …… Punnett square :	**0.5 pt**

♂ / ♀	n/ X_B **25%**	n/ X_b **25%**	n/ X_B **25%**	n/ X_b **25%**
n/ X_b **50%**	N//n X_BX_b **[NB]**	N//n X_bX_b **[Nb]**	n//n X_BX_b **[nB]**	n//n X_bX_b **[nb]**
n/ Y **50%**	N//n X_BY **[NB]**	N//n X_bY **[Nb]**	n//n X_BY **[nB]**	n//n X_bY **[nb]**
	25% [NB]	**25% [Nb]**	**25% [nB]**	**25% [nb]**

	We get four phenotypes having the same proportion - ¼ for each.	**0.5 pt**

questions	Exercise 4 (5 pts)	scores
1.a	-**figure a** : 68% of world electricity production relies on fossil resources (charcoal, gas and oil. . .)…….. **- figure b** : fossil-based electricity production emits more CO_2. . . ……. Electricity production relying on fossil resources emits a great quantity of CO_2 in the atmosphere; CO_2 is a greenhouse gas making the greenhouse phenomenon worse and worse.	**0.5 pt** **0.5 pt** **0.5 pt**
1.b	Two procedures among the following : - use of renewable energies; - use of nuclear energy; -decreasing the use of fossil energy.	**0.5 pt**
2	Effective procedures adopted by Morocco to maintain its commitment towards COP21 is reflected in : - reducing the electricity production based on fossil resources (figure a) - using more renewable energies by building solar stations and wind farms (figure b). → this allows Morocco to reduce CO_2 emissions.	**1 pt**

3	Using nuclear energy is risky: radioactivity emissions (iodine and caesium) have a negative impact on human beings' health and on the environment (nuclear pollution) – increasing cancer cases and more deaths.	**1 pt**
4	***Accept any appropriate opinion.*** The electricity production by nuclear stations is very important, but the dangers that may happen following accidents in central stations are enormous and have harmful consequences on the environment and the human health. That's why Morocco has adopted a strategy based on renewable energy. These energies even if they do not produce large amounts of energy compared to nuclear energy, they are clean and safe.	**1 pt**