

الصفحة	<b>الامتحان الوطني الموحد للبكالوريا</b> <b>الممالك الدولية</b> <b>الدورة الاستدراكية 2020</b> <b>- عناصر الإجابة -</b>		 المملكة المغربية وزارة التربية الوطنية والتكوين المهني والتعليم العالي والبحث العلمي المركز الوطني للتقويم والامتحانات
1			
5			
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	SSSSSSSSSSSSSSSSSSSS	RR 34E	

3	مدة الإنجاز	علوم الحياة والأرض	المادة
5	المعامل	شعبة العلوم التجريبية مسلك العلوم الفيزيائية (خيار إنجليزية)	الشعبة أو المسلك

Section I : Knowledge Retrieval (5 pts)		
	Questions	Scores
	<i>Accept any appropriate answers.</i>	
<b>I</b>	<p>- <b>Krebs cycle:</b> also called citric acid cycle, it is a sequence of reactions that degrades pyruvic acid (acetyl-coA) into CO<sub>2</sub> and H<sub>2</sub>O, it takes place in the mitochondrial matrix and is accompanied by the reduction of R to RH<sub>2</sub> and synthesis of ATP.. .....</p> <p>- <b>Phosphocreatine:</b> or creatine phosphate is a molecule rich in energy, it is used in the muscle for the regeneration of ATP under the action of creatine kinase. ....</p>	0.5 pt 0.5 pt
<b>II</b>	1, isolated muscle twitch; 2, incomplete fusion of two muscle twitches (temporal summation); 3, imperfect tetanus; 4, perfect tetanus .....(4×0.25)	1 pt
<b>III</b>	(1 ;c) ; (2 ;e) ; (3 ;b) ; (4 ;a) .....(4×0.25)	1 pts
<b>IV</b>	(1 ;b) ; (2 ;a) ; (3 ;d) ; (4 ;c) .....(4×0.5)	2 pts
Section II : Scientific reasoning and communication in graphic and written modes (15pts)		
Questions	Exercise 1 (3 pts)	Scores
<b>1</b>	<p><b>Exploiting document 1</b> .....</p> <p>- the addition of pyruvate results in a slight increase in ATP production and low oxygen consumption;</p> <p>- the addition of ADP + Pi in the presence of pyruvate results in a high production of ATP and a high consumption of oxygen;</p> <p>- the addition of cyanide results in the cessation of oxygen consumption and ATP production.</p> <p><b>Conditions for ATP production:</b> .....</p> <p>Presence of pyruvate;</p> <p>Presence of ADP + Pi;</p> <p>Presence of specific ATP-producing enzymes.</p> <p>Presence of O<sub>2</sub></p>	0.75 pt 0.5 pt

الصفحة	2	RR 34E	الامتحان الوطني الموحد للبكالوريا - الدورة الاستدراكية 2020 - عناصر الإجابة - مادة: علوم الحياة والأرض - شعبة العلوم التجريبية مسلك العلوم الفيزيائية (خيار إنجليزية)	
5				
2.a	<p><b>Comparison of results between muscles 2 and 1:</b> .....</p> <ul style="list-style-type: none"> <li>- Recording of a muscle contraction of the same duration for both muscles;</li> <li>- The amount of ATP remains unchanged in both muscles after muscle contraction;</li> <li>- Decrease in the amount of phosphocreatine in muscle 2 while it does not change in muscle 1.</li> </ul> <p><b>Comparison of results between muscle 3 and muscle 1:</b> .....</p> <ul style="list-style-type: none"> <li>- Recording of a muscle contraction that lasts a few seconds for muscle 3 and three minutes for muscle 1;</li> <li>- Depletion of ATP in muscle 3 after muscle contraction, while its quantity does not change for muscle 1;</li> <li>- After muscle contraction, the amount of phosphocreatine does not change in the two muscles 3 and 1.</li> </ul>	0.5 pt	0.5 pt	
2.b	<p><b>For muscle 2:</b> after inhibition of glycolysis, the muscle regenerates ATP via the phosphocreatine pathway, which explains the stability of the amount of ATP and the decrease in the amount of phosphocreatine after muscle contraction; .....</p> <p><b>For muscle 3:</b> after inhibition of glycolysis and phosphocreatine kinase activity, the regeneration of ATP from phosphocreatine and glucose is blocked. The muscle consumes its ATP stock which explains the depletion of ATP and the stability of the amount of phosphocreatine. ....</p> <p><b>The reactions of ATP regeneration are:</b> .....</p> <ul style="list-style-type: none"> <li>- Glucose degradation reaction (respiration and fermentation).</li> <li>- Phosphocreatine degradation reaction.</li> </ul>	0.25pt	0.25pt	0.25pt
Questions		<b>Exercise 2 (4 pts)</b>		<b>scores</b>
1	<p><b>Exploiting document 1 :</b></p> <ul style="list-style-type: none"> <li>- Compared to healthy tissues, we notice in cancerous tissues an increase in the speed of DNA duplication and a rapid increase in the number of cells, which indicates a rapid and random multiplication of cancer cells.....</li> </ul> <p><b>Accept any hypotheses relating the appearance of the tumor to a mutation which causes random proliferation of cells.....</b></p>	0.5pt	0.5pt	
2.a	<p><b>For the normal allele:</b></p> <p>mRNA : GGG CAG CGA UAG UUC CUU AAU</p> <p>Sequence of amino acids: Gly - Gln - Arg</p> <p><b>- For the mutant allele:</b></p> <p>mRNA: GGG CAG GCG AUA GUU CCU UAA UUC</p> <p>Sequence of amino acids: Gly - Gln - Ala - Ile - Val - Pro</p>	0.25pt	0.25pt	0.25pt
2.b	<p><b>Verification of the hypothesis:</b></p> <p>Mutation by addition of nucleotide C at the end of triplet 2 (or at the start of triplet 3) of the transcribed strand of the EGFR gene → change of the codons at the level of the mRNA from triplet 3 → appearance of the nonsense codon at triplet 7 instead of triplet 4 → extension of translation and synthesis of a longer and modified amino acid sequence (non-functional protein) → random proliferation of lung cells and appearance of lung cancer → hypothesis verified (or no).</p>			2 pt

Questions	Exercise 3 (4 pts)	scores																									
1	<p><b>* First cross:</b></p> <ul style="list-style-type: none"> <li>- F1 is homogeneous, Mendel's first law is verified → Inheritance not linked to sex..</li> <li>- F1 individuals have a parental phenotype for the trait of the corolla form and an intermediate phenotype for the trait of the color of the corolla:</li> <li>- The allele responsible for personalized form trait is dominant (A) and the allele responsible for the axial symmetry form trait is recessive (a).....</li> <li>- The codominance between the allele responsible for the red color of the corolla (R) and the allele responsible for the white color (B). of the corolla (B). .....</li> </ul> <p><b>Second cross:</b></p> <p>The F2 generation obtained is composed of six phenotypes:</p> <ul style="list-style-type: none"> <li>- [RB, A] with a percentage of <math>94/234 = 40,17\% \rightarrow 6/16</math>.</li> <li>- [R, A] with a percentage of <math>39/234 = 16,66\% \rightarrow 3/16</math>.</li> <li>- [B, A] with a percentage of <math>45/234 = 19,23\% \rightarrow 3/16</math>.</li> <li>- [RB, a] with a percentage of <math>28/234 = 11,96\% \rightarrow 2/16</math></li> <li>- [R, a] with a percentage of <math>15/234 = 6,41\% \rightarrow 1/16</math>.</li> <li>- [B, a] with a percentage of <math>13/234 = 5,55\% \rightarrow 1/16</math>.</li> </ul> <p>Therefore the two studied genes are independent .....</p>	<p>0.25 pt</p> <p>0.25 pt</p> <p>0.25 pt</p> <p>0.5 pt</p> <p>0.25 pt</p>																									
2	<p><b>Chromosome interpretation of the results of the second cross :</b></p> <p>Phenotypes :                      F1 : [RB,A]    F1 : [RB,A]</p> <p>Gynotypes :                      R//B A// a    R//B A// a</p> <div style="text-align: center; margin: 10px 0;"> </div> <p>Gametes :                      R/ A/ ¼ ; R/ a/ ¼                      R/ A/ ¼ ; R/ a/ ¼</p> <p style="margin-left: 100px;">B/ A/ ¼ ; B/ a/ ¼                      B/ A/ ¼ ; B/ a/ ¼</p> <p>Puett saquer : .....</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 15%;">gametes</th> <th style="width: 15%;">R/ A/ ¼</th> <th style="width: 15%;">R/ a/ ¼</th> <th style="width: 15%;">B/ A/ ¼</th> <th style="width: 15%;">B/ a/ ¼</th> </tr> </thead> <tbody> <tr> <td>R/ A/ ¼</td> <td>R//R A//A [R,A] 1/16</td> <td>R//R A// a [R,A] 1/16</td> <td>R//B A//A [RB,A] 1/16</td> <td>R//B A// a [RB,A] 1/16</td> </tr> <tr> <td>R/ a/ ¼</td> <td>R//R A// a [R,A] 1/16</td> <td>R//R a// a [R, a] 1/16</td> <td>R//B A// a [RB,A] 1/16</td> <td>R//B a// a [RB, a] 1/16</td> </tr> <tr> <td>B/ A/ ¼</td> <td>R//B A//A [RB,A] 1/16</td> <td>R//B A// a [RB,A] 1/16</td> <td>B//B A//A [B,A] 1/16</td> <td>B//B A// a [B,A] 1/16</td> </tr> <tr> <td>B/ a/ ¼</td> <td>R//B A// a [RB,A] 1/16</td> <td>R//B a// a [RB, a] 1/16</td> <td>B//B A// a [B,A] 1/16</td> <td>B//B a// a [B, a] 1/16</td> </tr> </tbody> </table> <p>We obtain: [RB, A] 6/16 ; [R, A] 3/16 ; [B, A] 3/16; [RB, a] 2/16; [R, a] 1/16; [B, a] 1/16</p> <p>The theoretical results are consistent with the experimental results.....</p>	gametes	R/ A/ ¼	R/ a/ ¼	B/ A/ ¼	B/ a/ ¼	R/ A/ ¼	R//R A//A [R,A] 1/16	R//R A// a [R,A] 1/16	R//B A//A [RB,A] 1/16	R//B A// a [RB,A] 1/16	R/ a/ ¼	R//R A// a [R,A] 1/16	R//R a// a [R, a] 1/16	R//B A// a [RB,A] 1/16	R//B a// a [RB, a] 1/16	B/ A/ ¼	R//B A//A [RB,A] 1/16	R//B A// a [RB,A] 1/16	B//B A//A [B,A] 1/16	B//B A// a [B,A] 1/16	B/ a/ ¼	R//B A// a [RB,A] 1/16	R//B a// a [RB, a] 1/16	B//B A// a [B,A] 1/16	B//B a// a [B, a] 1/16	<p>0.25 pt</p> <p>0.25 pt</p> <p>0.75 pt</p> <p>0.25 pt</p>
gametes	R/ A/ ¼	R/ a/ ¼	B/ A/ ¼	B/ a/ ¼																							
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4			
5			
3	<p><b>Determination of the crossing which makes it possible to obtain the largest proportion of snapdragon plants with pink corolla with axial symmetry:</b> - crossing between plants with white corolla with axial symmetry and plants with red corolla with axial symmetry.....</p> <p><b>Justification:</b> the cross between the phenotype [B, a] and the phenotype; [R, a] will give 100% of the plants of phenotype [RB, a].....</p>	0.5 pt	0.5 pt
<b>If the candidate has responded to exercises 4 and 5, consider the exercise with the highest score.</b>			
<b>Exercise 4 (4pts)</b>			
1.a	<p><b>- Correct description, for example:</b> - The ozone concentration in the stratosphere gradually increases with altitude to reach its maximum of 8 ppm at an altitude of 35 km; .....</p> <p>- After an altitude of 35 km, the ozone concentration gradually decreases to 2.5 ppm at around an altitude of 50 km. ....</p>	0.25 pt	0.25 pt
1.b	<p><b>The relationship :</b> - In the stratosphere at altitudes below 35 km, the increase in the concentration of ozone as a function of altitude is correlated with atmospheric pressure values greater than 7 hPa → dominance of ozone formation reactions: (O<sub>2</sub> → 2O) and (O<sub>2</sub> + O → O<sub>3</sub>). .....</p> <p>- In the stratosphere at altitudes exceeding 35 km, the decrease in the concentration of ozone is correlated with atmospheric pressure values below 7hPa → dominance of ozone destruction reactions (O<sub>3</sub> + O → 2O<sub>2</sub>). .....</p>	0.5 pt	0.5 pt
2.a	<p><b>Correct description, for example:</b> - By exceeding an altitude of 60 ° south, there is an increase in the concentration of chlorine monoxide in the stratosphere which reaches its maximum then stabilizes from a latitude of 68 ° south, while the concentration of ozone in the stratosphere decreases to reach its minimum around 67 ° and stabilizes. ....</p> <p>- There is an anticorrelation between the O<sub>3</sub> and ClO concentrations in the stratosphere; a decrease in the concentration of O<sub>3</sub> is correlated with an increase in the concentration of ClO. ....</p>	0.25 pt	0.25 pt
2.b	<p>- the danger of chlorine lies in its ability to reduce the quantity of ozone in stratosphere through the following reaction: Cl + O<sub>3</sub> → ClO + O<sub>2</sub> .....</p> <p>- the release of chlorine from ClO through the reaction : ClO + O → Cl + O<sub>2</sub> Allows its insertion into new ozone destruction cycles.....</p>	0.25 pt	0.25 pt
3	<p><b>- Document 4:</b> the application of the Copenhagen agreement in the Wallonia region has enabled a significant reduction in the quantity of the CFC complex in the stratosphere from 450 tonnes in 1995 to 120 tonnes in 2004.....</p> <p><b>- Document 5:</b> HFC and HCFC substitute products are characterized by a short lifespan and a very low ozone-depleting ozone capacity compared to CFCs .....</p> <p>- For example: The decision made in the Copenhagen Accord is effective in protecting the ozone layer from destruction by the CFC. ....</p>	0.5 pt	0.5pt 0.5pt

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5			

Questions	Exercise 5 (4 pts)	scores
1	<p><b>Four indices such as:</b> ..... (4 × 0.25 pt)</p> <ul style="list-style-type: none"> <li>- Convergence of the two plates, Nazca and South America;</li> <li>- Presence of an ocean trench;</li> <li>- Distribution of volcanoes along the ocean margin of South America;</li> <li>- Presence of earthquakes whose depth of hearths increases away from the pit;</li> <li>- Presence of andesite and granodiorites;</li> <li>- Presence of folds and reverse faults.</li> </ul>	1 pt
2.a	<p><b>The temperature prevailing in a partial melting zone of peridotite:</b> 600 ° C to 1200 ° C (we accept 600 to 1000 ° C)</p>	0.25 pt
2.b	<ul style="list-style-type: none"> <li>- For non-hydrated or "dry" peridotites, the geotherm does not intersect the solidus → the prevailing temperature in the subduction zone is insufficient for partial melting of the peridotite in the absence of water → no genesis of andesitic magma. ....</li> <li>- For hydrated peridotites, the solidus is moved to lower temperatures, it then intersects with the geotherm of the subduction zone between 80 and 200 km deep → the conditions (P and T) are favorable for the partial fusion of the peridotite in the presence of water → genesis of andesitic magma. ....</li> </ul>	0.5 pt
	<ul style="list-style-type: none"> <li>- In the presence of water, the temperature of the partial fusion of peridotite drops, which allows the genesis of magma at a depth of 80km to 200km and a temperature of 800 ° C to 1300 ° C. ....</li> </ul>	0.25 pt
3	<p><b>During the burial of the oceanic lithosphere, the metagabbro undergoes a dynamic metamorphism because:</b></p> <ul style="list-style-type: none"> <li>- The metagabbro with facies of green shale is transformed into metagabbro with facies of blue shale → disappearance of chlorite and actinote, appearance of glaucophane and release of water under the effect of high pressure and low temperature. ....</li> <li>- The metagabbro with facies of blue shale is transformed into metagabbro with facies of eclogite → disappearance of glaucophane, appearance of garnet and jadeite and release of water under the effect of high pressure and low temperature. ....</li> </ul>	0.25 pt
	<p><b>Deduction:</b> the water necessary for the partial fusion of the peridotites of the overlapping plate is released by the mineralogical reactions at the level of the metagabbros of the plunging oceanic plate under the effect of high pressure and low temperature. ....</p>	0.25 pt
	<p><b>Deduction:</b> the water necessary for the partial fusion of the peridotites of the overlapping plate is released by the mineralogical reactions at the level of the metagabbros of the plunging oceanic plate under the effect of high pressure and low temperature. ....</p>	0.5 pt
4	<p>In the subduction zones, the pressure increases following the convergence of the two plates → the rocks of the diving plate undergo mineralogical reactions accompanied by a release of water following a dynamic metamorphism → hydration of the peridotites of the overlapping plate → decrease of the temperature necessary for the partial fusion of peridotites → genesis of an andesitic magma.</p>	0.5 pt

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