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Support Pack | Grade 12

CAPS

Life Sciences

Practice Examination: Paper 2 memo

This support pack consists of a memorandum of answers for Paper 2 of the **Life Sciences Grade 12 CAPS curriculum** so that you or the learners can check their answers and assess their readiness for the examinations. You have permission to print or photocopy this document or distribute it electronically via email or WhatsApp.

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We are all in this together!

Memorandum of answers

PAPER 2

SECTION A

QUESTION 1

1.1
1.1.1 A
1.1.2 C
1.1.3 A
1.1.4 B
1.1.5 C
1.1.6 C
1.1.7 D
1.1.8 B
1.1.9 B
1.1.10 C

1.2
1.2.1 sympatric speciation
1.2.2 homologous structures
1.2.3 nucleotides
1.2.4 replication
1.2.5 genetic engineering/DNA recombination/DNA manipulation
1.2.6 chromatids

1.3
1.3.1 Both A and B
1.3.2 A only
1.3.3 B only
1.3.4 Both A and B
1.3.5 B only
1.3.6 A only
1.3.7 None
1.3.8 B only

1.4
1.4.1 **a)** RrYy
b) rryy
1.4.2 RY; Ry; rY; ry
1.4.3 **a)** wrinkled, yellow seeds
b) round, yellow seeds
1.4.4 RRYY

SECTION B

QUESTION 2

2.1

2.1.1 **a)** transcription
b) translation

2.1.2 ribosome

2.1.3 The process is called transcription. Free (RNA) nucleotides from the nucleoplasm arrange according to the base sequence of the DNA template in a complementary way: A-U and C-G. Sugar-phosphate bonds form between nucleotides to form the required mRNA. The process is controlled by enzymes.

2.1.4
- According to the codons on mRNA
- tRNA molecules with matching anticodons
- Bring the required amino acids to the ribosome
- This is called translation
- The amino acids become attached by peptide bonds to form the required protein

2.1.5 1 – GUU; 2 – CAA; 3 – CGT

2.2

2.2.1 They carefully analysed and verified the evidence/findings before releasing the results.

2.2.2 To inform people of their findings so that they can critique/verify their findings/use it for future research/acknowledge ownership of the findings.

2.2.3 A transitional form has characteristics of both the australopithecines and humans.

2.2.4 The brain was small like other australopithecine species but the re-organisation/ configuration of the brain/an expansion behind and above the eyes was more like modern humans. **OR** Brain/hand/foot have characteristics of both modern and early pre-human.

2.3

2.3.1 *Palaeomastodon* sp.

2.3.2 *Elephas* sp. and *Loxondonta* sp.

2.3.3 *Primelaphus* sp.

2.3.4 **a)** Miocene
b) Pleistocene

2.4

2.4.1 B

2.4.2 XX chromosomes/two identical sex chromosomes

2.4.3 A

2.4.4 Down's syndrome

2.4.5 Caused by faulty meiotic division/oogenesis during production of the ovum/sperm production; the chromosomes of chromosome pair 21 fail to separate.

QUESTION 3

3.1

3.1.1 **a)** time
b) mortality of mosquitoes

3.1.2 Any two: use larger sample of mosquitoes; repeat the investigation; take many samples each time and calculate the average mortality.

3.1.3 More mosquitoes are produced than can survive, there is genetic variation amongst mosquitoes, some mosquitoes may be naturally resistant to DDT. When DDT is applied, those that are resistant survive, they then reproduce, passing the allele for resistance to the offspring. Those that are not resistant, die, their alleles are lost from the population, the number of DDT resistant mosquitoes therefore increase over the generations.

3.2

3.2.1 To increase the reliability of the results.

3.2.2 1:1/(90:90)

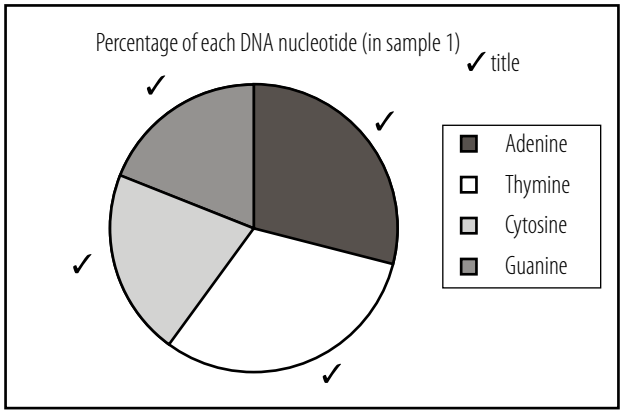
3.2.3 In a DNA molecule, thymine always pairs with adenine/thymine and adenine are complementary bases.

3.2.4 $\frac{29 \times 360^{\circ}}{100} = 104{,}4^{\circ} / 104^{\circ}$

$\frac{31 \times 360^{\circ}}{100} = 111{,}6^{\circ} / 112^{\circ}$

$\frac{21 \times 360^{\circ}}{100} = 75{,}6^{\circ} / 76^{\circ}$

$\frac{19 \times 360^{\circ}}{100} = 68{,}4^{\circ} / 68^{\circ}$



Mark allocation of the pie chart

Calculations/working to determine the correct proportions	**2 marks: All four calculations correct 1 mark: 1 to 3 calculations correct**
Correct type of graph (pie chart)	1
Title of graph	1
Proportions accurate for each sector/slice labelled/key	4 marks: All four sectors correct (use transparency template) (1 x mark/sector)

3.3

3.3.1 4

3.3.2 The allele for the trait is carried on the X-chromosome/ Y-chromosome does not carry the allele for the trait. Male only has one X-chromosome. A male needs only one recessive allele to be haemophiliac, whereas for a female to be haemophiliac both alleles must be recessive.

3.3.3 a) XH Xh; b) XhY

3.4

3.4.1 The oldest fossils of human ancestors were only found in Africa.

3.4.2 According to this theory – modern humans evolved relatively recently in Africa and migrated into Europe and Asia and replaced all populations which had descended from *Homo erectus*. After *H. erectus* migrated out of Africa the differently populations became reproductively isolated, evolving independently, and in some cases like the Neanderthals into separate species. *H. sapiens* ultimately arose in Africa and migrated out of Africa and replaced all other human-like populations without inter-breeding.

3.4.3
- Mitochondrial DNA is relatively short in size.
- A greater percentage of mutations therefore occur here.
- These mutations can therefore be easily studied.
- mtDNA is passed down from the mother to child.
- Mutations on the mtDNA were traced to an ancestral female that existed in Africa.

QUESTION 4

Natural selection e.g. Finches* (or any other example)
- Organisms of a particular species show a great deal of variation.
- Some individuals may have characteristics (any example) that are favourable/some individuals may be adapted to the environment.
- Others may have characteristics (any example) that are unfavourable.
- Selective pressure by the environment due to competition/changing environmental conditions.
- Organisms with favourable characteristics survive and reproduce to pass on favourable characteristics to their offspring, while organisms with unfavourable characteristics will die out.
- Over time the whole population will have the favourable trait.
- Over time these organisms might develop genotypically and phenotypically independently into different species that cannot inter-breed.

Compulsory mark, max. 7 + 1 for example

Artificial selection e.g. Production of improved fruit/ meat production*
- Organisms of a particular species (any example) show a great deal of variation.
- Humans select organisms with a particular desirable characteristic and inter-breed them with other organisms that also have the same desirable characteristic to improve this characteristic further in the offspring.
- They may also choose organisms with different desirable characteristics to get offspring with a combination of these desirable characteristics.

Compulsory mark, max. 4 + 1 for example

Differences between Natural and Artificial selection

Natural selection	Artificial selection
Selective pressure by the environment	Humans select the desirable characteristic
Selection is in response to suitability to the environment	Selection is in response to satisfying human needs
Organisms can survive on their own in the environment (since they were selected on the basis of their suitability to the environment)	Organisms may often not survive on their own in the environment (since they were selected on the basis of human needs and not on suitability to the environment)
No human effort/cost involved	Could be labour intensive/expensive

Assessing the presentation of the essay

Criterion	Relevance (R)	Logical sequence (L)	Comprehensive (C)
Generally	All information provided is relevant to the topic	Ideas are arranged in a logical sequence	All aspects required by the essay have been sufficiently addressed
In this essay	All the critical differences between NS and AS are included	Process of natural selection – variation; selective pressure; favourable characteristics; develops independently AS – variation; desirable characteristics chosen by humans	The following must be covered: • the processes of NS and AS highlighting the differences
Mark	1	1	1