



MEMORANDUM

JUNE EXAMINATIONS

GRADE 12

2011

GRADE 12 MEMORANDUM- JUNE EXAM 2011

SECTION A

QUESTION 1.

1.1

1.1.1 B ✓✓

1.1.2 D ✓✓

1.1.3 C ✓✓

1.1.4 A ✓✓

1.1.5 C ✓✓

5X2=(10)

1.2

1.2.1 Lamarck ✓

1.2.2 Albinism ✓

1.2.3 Centromere /Chiasma✓

1.2.4 Hydrogen bonds ✓

1.2.5 Natural Selection ✓

5x1 = (5)

1.3

1.3.1 F ✓

1.3.2 E ✓

1.3.3 C ✓

1.3.4 B ✓

1.3.5 D ✓

5x1=(5)

1.4

1.4.1 Metaphase 2 ✓

(1)

1.4.2 1= Spindle fibre ✓

.. 2 = Centriole/poles ✓

(2)

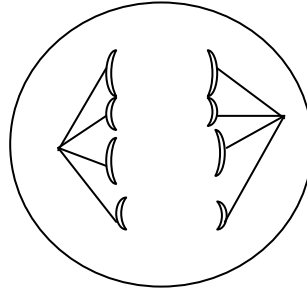
1.4.3 8 ✓✓

(2)

1.4.4 4✓✓

(2)

1.4.5 Anaphase 2 ✓



✓✓ correct diagram showing chromatids splitting and moving to the poles with spindle fibers. (3)

1.4.6. Prophase 1 ✓ (1)

1.4.7 reduction of chromosome number from diploid to haploid ✓

Role in production of gametes ✓

Mechanism to introduce genetic variation✓ (3)

1.4.8 Chromosomal mutation/aberration. ✓✓✓ (2)

1.4.9 Down syndrome✓, haemophilia✓, sickle cell anaemia✓ (3)
(19)

1.5

1.5.1) DNA ✓ (1)

1.5.2) 1 – hydrogen bond 2 – Phosphate 3 –deoxyribose 4 - thymine 5 – cytosine (5)

1.5.3) nucleotide ✓ (1)

1.5.4) UCAG✓✓ (2)

1.5.6) Nucleus and mitochondrion ✓✓ (2)

TOTAL SECTION A= (50)

SECTION B

QUESTION 2

2.1

2.1.1 humans have a flatter face ✓ due to a less sloping forehead than chimpanzee (chimpanzees have bigger brow ridges) ✓ less protruding jaws than chimpanzee, (chimpanzees have bigger teeth) ✓ more developed chin than chimpanzee ✓ **any three** (3)

2.1.2 The human is bipedal ✓, the foramen magnum is in a more forward position than in the chimpanzee ✓✓ (3)

2.1.3 Opposable thumb, bare fingertips, long arms, freely rotating arms, stereoscopic vision, eyes with cones, large brain compared to body mass, olfactory brain centres diminished, few offspring, upright posture. ✓✓✓✓ **Any four** (4)

2.2

2.2.1 1- *Australopithecus afarensis* ✓

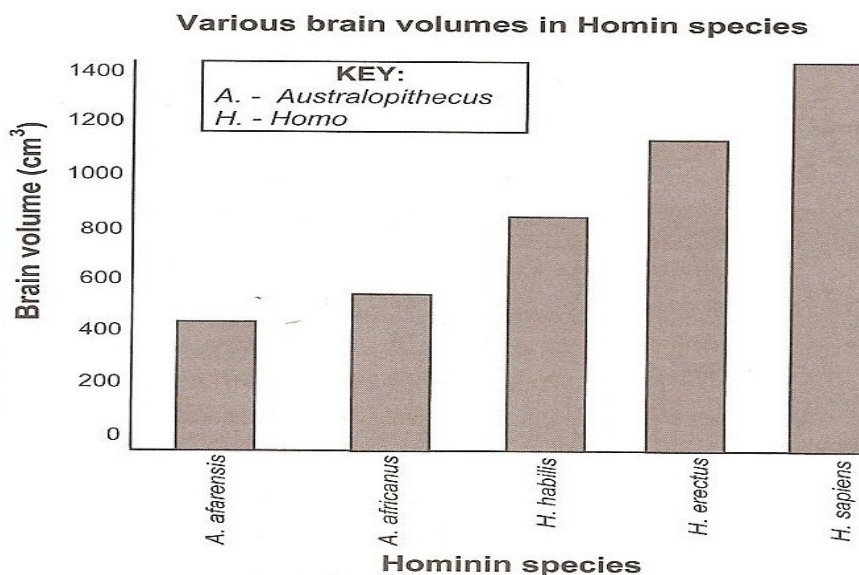
2- *Australopithecus africanus* ✓

3- *Homo habilis* ✓

4 - *Homo erectus* ✓

5- *Homo sapiens* ✓ (5)

2.2.2



✓ Title of graph, ✓Y –axis , ✓for each bar with its label (The spaces between the bars should be even)

2.2.3 The *Australopithecus afarensis*✓, they have the smallest brain capacity. ✓ (2)

2.2.4 The *Homo* genus✓ their brains are larger and more developed✓✓ (2)

2.2.4 Mrs Ples, Taung child , Little foot, Lucy, *Australopithecus africanus*

Australopithecus sediba/karabo (any 3) (3)

(20)

QUESTION 3

3.1.1 Transcription ✓ (1)

3.1.2 The DNA coil unwinds ✓ and weak hydrogen bonds break ✓ and DNA splits into two single strands ✓

Single strand is used as template ✓free RNA nucleotides are picked up from nucleoplasm ✓ to build a complementary strand called m-RNA ✓

With the help of the enzyme transcriptase ✓ any four (4)

3.1.3 T-RNA ✓ they are carrying amino acids ✓ (2)

3.1.4 Translation ✓ (1)

3.1.5 AAA ✓✓ (2)

3.1.6 Proteins/polypeptides ✓ (1)

(11)

3.2

3.2.1) To ensure that the embryo (or offspring/baby) will have the same DNA as the donor sheep. ✓✓ (2)

3.2.2) No ✓✓ (2)

3.2.3) Dolly will have exactly the same DNA as the first donor sheep ✓✓ / DNA of the second donor was removed and replaced (2)

3.2.4) Mitosis ✓✓ (2)

3.3

3.3.1) i) $I^A I^B$ ✓✓ (2)

ii) $I^A I$ or II or $I^B I$ ✓✓ (2)

3.3.2) It is a sex-linked disease caused by a recessive allele carried on the .. X chromosome. ✓

Males need only one recessive allele✓ to have the disease because they have XY✓ combination, while females have to have both recessive alleles ✓to have haemophilia because they have an XX✓ combination. (3)

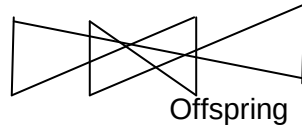
3.3.3) P1 genotype $I^B I^B \times I I$

Meiosis

Gametes $I^B \quad I^B \times I \quad I$ ✓ for O blood group gametes

Fertilisation

F1:



$I^B I \quad I^B I \quad I^B I \quad I^B I \quad \checkmark \checkmark \checkmark$

Or:

	I^B	I^B
I	$I^B I$	$I^B I$
I	$I^B I$	$I^B I$

One mark blood group O gametes✓

Three marks for the correct offspring ✓✓✓

(4)
(11)

Total Section B=(60)

SECTION C

QUESTION 4

4.1

- a) The serum contains antibodies against chimpanzee protein ✓✓ (2)
- b.) Pig✓, it only forms a very low percentage precipitate ✓✓ when the blood is exposed to .. serum (3)
- c) A high percentage of precipitate✓ formed indicates a close relationship with chimpanzees✓
OR A low percentage of precipitate ✓formed indicates no relationship ✓with chimpanzees

OR A high percentage of precipitate ✓formed indicates a weak relationship with chimpanzees✓

OR A low percentage of precipitate✓ formed indicates a strong relationship with chimpanzees✓ (2)
- d) Temperature, pH, concentration of serum, amount of serum and blood the same. (any two) (2)

4.2

- 4.2.1.) Carboniferous period✓ (1)
- 4.2.2) Yes✓, they evolved from a common ancestor **OR** No, they evolved separately from common ancestor ✓✓ (3)
- 4.2.3) Dinosaurs ✓ (1)
- 4.2.4) Relative dating: Fossil age is estimated relative to other layers/bottom layer is older than top layer ✓✓
- 4.2.5)

Climates changed and animals could not survive the cold (they died of exposure)✓ or adapt to it✓

Melting ice caused massive floods✓ and tsunamis✓

Mid Atlantic ocean current stopped and no nutrients, energy, heat or food distributed to world oceans✓

Plants died which were a food source for the animals causing them to starve✓

(mark any 4)

4.3 Importance of genetic engineering:

Medicine✓ i.e production of insulin for diabetes patients, production of hormones, production of vaccines. (✓✓ for examples)

Agriculture✓ ie. Genetically modified crops that are drought resistant, disease resistant and insect resistant. (✓✓ for examples) (6)

Ethics:

Pro: (any 4) (4)

- it could save many human lives,
- it helps to feed the ever-growing human population as crops are more successful ,thus leading to more food production
- crops have a better nutritional value as the best trait of each plant is used to create better crops,
- the use of pesticides on crops is reduced as pest-resistant crop does not need pesticide, which benefits the environment as well as humans
- selective breeding helps to create better cattle breeds which produce more meat, milk etc.

Against (any 4) (4)

- religious – it's against God's will,
- Moral – it is immoral
- Safety issues – how do we know these crops are safe? How do we know the new medicines will not cause secondary illnesses?
- It is expensive
- Cloning of animals –what about the ethical treatment of animals?
- The danger of these GM crops interbreeding with the wild (natural) crops and in the process wiping out natural crops.
- An economical monopoly that will arise because major companies have the patent rights to the seeds of these crops and farmers have to buy the seeds from them every year

Legislations (Any 3) (3)

- Researchers should be subjected to strict controls/legislation when doing research on cloning
- GM crops should be sterile as not to mix with natural occurring crops
- Genetically engineered medicine should be subjected to strict testing procedures
- A governing body which determine legislation and control thereof
- Any proposed legislation that makes sense

CRITERIA			
	1	2	3
Synthesis	Gaps in the logical flow of the essay.	Few gaps in the logical flow of the essay. There is some structure in the essay.	The essay is structured and shows insight on the topic. Ideas follow logically.

**Synthesis = (3)
(20)**

Total Section C = (40)

TOTAL = 150