**MEMORANDUM LIFE SCIENCES COMMON EXAM JUNE 2015.**

**GRADE 11**

**PRINCIPLES RELATED TO MARKING LIFE SCIENCES**

1. **If more information than marks allocated is given**

Stop marking when maximum marks is reached and put a wavy line and ‘max’ in the right-hand margin.

2. **If, for example, three reasons are required and five are given**

Mark the first three irrespective of whether all or some are correct /incorrect.

3. **If whole process is given when only part of it is required**

Read all and credit relevant part.

4. **If comparisons are asked for and descriptions are given**

Accept if differences / similarities are clear.

5. **If tabulation is required but paragraphs are given**

Candidates will lose marks for not tabulating.

6. **If diagrams are given with annotations when descriptions are required**

Candidates will lose marks

7. **If flow charts are given instead of descriptions**

Candidates will lose marks.

8. **If sequence is muddled and links do not make sense**

Where sequence and links are correct, credit. Where sequence and links is incorrect, do not credit. If sequence and links becomes correct again, resume credit.

9. **Non-recognised abbreviations**

Accept if first defined in answer. If not defined, do not credit the unrecognized abbreviation but credit the rest of answer if correct.

10. **Wrong numbering**

If answer fits into the correct sequence of questions but the wrong number is given, it is acceptable.

11. **If language used changes the intended meaning**

Do not accept.

12. **Spelling errors**

If recognizable accept provided it does not mean something else in Life Sciences or if it is out of context**.**

13. **If common names given in terminology**

Accept provided it was accepted at the memo discussion meeting.

14. **If only letter is asked for and only name is given (and vice versa)**

No credit

15. **If units are not given in measurements**

Candidates will lose marks. Memorandum will allocate marks for units separately

16. Be sensitive to the **sense of an answer, which may be stated in a different way**.

17. **Caption**

All illustrations (diagrams, graphs, tables, etc.) must have a caption

18. **Code-switching of official languages (terms and concepts)**

A single word or two that appears in any official language other than the learners’ assessment language used to the greatest extent in his/her answers should be credited, if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.

**SECTION A**

**QUESTION 1**

**1.1 Multichoice.**

1.1.1 C √√

1.1.2 B √√

1.1.3 C √√

1.1.4 D √√

1.1.5 C √√

1.1.6 D √√

1.1.7 B √√

1.1.8 D √√

1.1.9 C √√

1.1.10 A √√ **(10 × 2) (20)**

**1.2 Give the correct biological term.**

**1.2.1 Phosphorylation** √

**1.2.2 Peristalsis √**

**1.2.3 Homosporous** √

**1.2.4 Fruit** √

**1.2.5 Notochord √**

**1.2.6 Mesoderm√ (6 × 1) (6)**

1.3 Matching columns.

1.3.1 A only √√

1.3.2 B only √√

1.3.3 Both A and B √√

1.3.4 Both A and B √√

1.3.5 Both A and B√√

1.3.6 A only √√

1.3.7 B only √√ **(7 × 2) (14)**

**1. 4** Study the flow diagram and answer the questions that follow.

1.4.1 Phylogenetic tree/ cladogram √ (1)

1.4.2 Cnidaria √ (1)

1.4.3 Platyhelminthes √ (1)

1.4.4 Arthropoda. √ Arthropoda and Annelida have common ancestor. √ (1)

1.4.5 Chordata √ (1)

1.4.6 (a) 1 √ (1)

(b) 3 √ (1)

1.4.7 (a) ANY ONE Hydra, Jelly fish, blue bottles, sea anemone,

hard corals √ (1)

(b) ANY ONE Leech, earthworm, polychaete or bristle worm √ (1) **(10)**

**TOTAL SECTION A: 50**

**SECTION B**

**QUESTION 2**

2.1

2.1.1. Bacteria (1)

2.1.2.

Rubric

|  |  |
| --- | --- |
|  | Mark |
| Caption | 1 |
| Correct shape | 1 |
| Any three labels correctly indicated | 3 |

(5)

**(6)**

2.2.

2.2.1. *Anopheles sp.* (1)

2.2.2. Red blood cells

Liver cells (2)

2.2.3. Infected red blood cells rupture and can cause blockages in the blood vessels of major organs such as the liver, kidneys and brain. (1)

2.2.4. a) DDT is not biodegradable✓ and accumulates in the soil and food

chains. It can be the cause of disease and even death✓ (2)

b) Yes. Too many people die due to malaria. If the use of DDT is controlled it will not cause pollution.✓

**OR**

No. DDT is too dangerous to unban. Controlled use is not possible.

(1) **(7)**

2.3.

2.3.1. During fermentation✓ yeast break down glucose✓ to form ethanol✓ and CO2 (3)

2.3.2. A large amount of glucose✓ is still present in the solution, therefore the yeast cells are able to multiply and increase✓ in number. (2)

2.3.3. The glucose becomes depleted. ✓The yeast cells die✓ (2)

**(7)**

2.4.

2.4.1. a) A Bryophyta

B Pteridophyta

C Spermatophyta (3)

b) A The leaf-like structures of the moss lack stomata and a cuticle✓

They are able to absorb water through the leaves but can also easily dry out.✓ (2)

B The fern has compound leaves (fronds). ✓They have stomata and a cuticle.✓ Young leaves are circinated.✓

Sori containing the sporangiums are carried on the leaves Any 2 (2)

C The leaves of the pine are reduced to needles.✓ Together with sunken stomata✓ and a thick cuticle✓ water loss is reduced

Any 2 (2)

**(6)**

c) A Spores are produced in sporangium (1)

B Spores are produced in sporangia of the sorus (1)

C Seeds are formed in the female cone (1)  **(3)**

**(12)**

2.4.2. A – 3

B – 9

C – 10 / 11

D – 5

E – 2 (5)

2.4.3. Both the sperm cells formed in the pollen grain are used during fertilisation.✓

One sperm fuses with the ovum to form the zygote (2n)✓

The second sperm fuses with the other two nuclei (polar bodies)

to form the endosperm (3n) ✓ (3)

**(8)**

**TOTAL QUESTION 2: 40**

**QUESTION 3**

3.1.

3.1.1. Chloroplast✓ (1)

3.1.2. Chemical potential energy✓ (1)

3.1.3. ATP✓

The co-enzyme ADP + P (phosphate) + chemical potential energy✓ is converted into ATP, called phosphorylation.✓ (3)

3.1.4. 2 – Hydrogen✓ (1)

3.1.5. Substance B – CO2✓ (1)

3.1.6. Byproduct A – O2✓ (1)

3.1.7. Glucose✓ (1)

**(9)**

3.2.

3.2.1. To test if CO2 is necessary for photosynthesis✓ (1)

3.2.2. Light

Chlorophyll (2)

3.2.3. a) before the leaf was destarched (1)

Brown

Blue black

✓

b) after the leaf was destarched (1)

Brown

✓

c) after the leaf was exposed to sunlight (1) Brown

Blue black

* **(6)**

3.3.

3.3.1. The rate of photosynthesis increased✓✓ (2)

3.3.2. Light intensity✓ (1)

3.3.3. If the CO2 concentration level remains high over a long period of time, the rate of photosynthesis levels off due to the toxic effect✓ (pH level drops) of the carbon dioxide.

Other limiting factors such as insufficient water✓ (2) **(5)**

3.4.

3.4.1. 3 – Small intestines / duodenum

4 – Stomach (2)

3.4.2. 4 – Gastric juice

7 – Pancreatic juice (2)

3.4.3. Number 6 is the pancreatic duct transporting the digestive juice✓ containing the enzymes✓ to the duodenum. Here the chemical digestion of proteins, carbohydrates and lipids are completed.✓ If the duct is cut the enzymes will not reach✓ the small intestines and digestion will be affected.

The hormones insulin and glucagon✓ that control the glucose concentration of the blood will not be affected as they are transported from the pancreas to the liver by the blood✓ and not by any duct. Therefore diabetes will not develop. (5)

3.4.4. Large surface area✓: The small intestines is a long structure containing millions of villi ✓

Thin surface✓: The villi consist out of a single layer of columnar epithelium✓

Surface in close contact to the substance to be absorbed✓: The blood is separated from the nutrients to be absorbed by only one layer of epithelium and one layer of endothelium✓

Transport system✓: Blood transport glucose and amino acids

Lymph transport fatty acids✓ any 3 x 2 (6)

**(15)**

3.5.

3.5.1. Peanut butter (1)

3.5.2. 500 kJ (1)

3.5.3. Two slices of brown bread:

60 x 10 = 600 kJ

Spoon full of peanut butter:

2350 ÷ 10 = 235 kJ

Glass of milk:

153 x 2 = 306 kJ any 2 correct calculations✓✓

Total: 600 + 235 +306 = 1141 kJ ✓ (3) **(5)**

**TOTAL QUESTION 3: 40**

**SECTION C**

**QUESTION 4**

**Agree/ or disagree √ with motivation √ √**  (3)

Many invertebrates at bottom of food chain in ocean.

They die, fish will die, and humans have no food. Humans will die without food.

Same will happen on land.

**POSITIVE ROLE OF ARTHROPODS IN ECOSYSTEMS AND AGRICULTURE**

* POLLINATION **any** **four marks.√ √ √ √ (4)**

Without **insect pollinators**, **flowering plants** would disappear and **ecosystems** will collapse

Pollinators important in **food supply** systems – crops like fruit crops, vegetable crops, oilseed crops, nuts, coffee, cocoa

Indigenous **diversity** of plants will disappear.

Bees excellent pollinators. They spend most of their lives collecting pollen to feed developing offspring

Butterflies, moths, ants, flies, beetles.

* DECOMPOSITION **any** **four marks.√ √ √ √**  (4)

Wood wasps, longhorned beetles – role in decomposition**. Lay eggs** in bark of dead trees. **Larvae eat** **wood**. Help to **break up tree.**

Carpenter ants and termites build **nests** in dead trees.

Termites turn wood into **sawdust**, contributes to **humus** in soil.

* SOIL AERATION **any** **four marks.√ √ √ √** (4)

Termites, ants aerate soil. **Burrow tunnels**. Improves **soil structure** and improves **drainage.**

Termites carry dry grasses and leaves into nests underground. Add **organic matter** and nutrients.

Dung beetles play role in decomposition. Larvae feed on undigested plant fibre in dung. Adults suck juice from dung. Breaks down dung

Maggots and carrion beetles – decomposition of dead bodies of animals.

NEGATIVE IMPACT OF ARTHROPODS: √ √ (2)

Some vectors of **infectious disease**. Ticks, mites, houseflies.

Ticks blood suckers make animals anemic. Tick bite fever – animals can die.

Malaria mosquito. Millions of people die.

Tsetse flies cause sleeping sickness. Cattle, horses.

Some arthropods are **pests to crops** e.g. locusts, cotton ball weevils, pine aphids, rose beetles, eldana borer in sugar cane.

|  |  |  |  |
| --- | --- | --- | --- |
| **Criterion** | **Relevance** | **Logical sequence** | **Comprehensive** |
| **Elaboration** | All information provided  is relevant to the topic | Ideas are arranged in a  logical/cause-effect sequence | All aspects required by  the essay have been addressed |
| **Mark** | 1 | 1 | 1 |
|  | Only information relevant to the **role of arthropods in ecosystems and agriculture.**  (There is no irrelevant information) | The positive role (pollination, decomposition and soil aeration) and negative impacts are presented in the correct sequence linked to the appropriate events | The positive and negative roles/ impact is discussed/compared |

**R****L** **C**

**(3)**

**NOTE: NO marks will be awarded for answers in the form of flow charts or diagrams.**

**TOTAL SECTION C: 20**

**GRAND TOTAL: 150**