

**JOHANNESBURG REGION**

**LIFE SCIENCES**

**JUNE EXAMINATION 2016**

**GRADE 11**

**MARKS: 150**

**TIME: 2½ HOURS**

**This question paper consists of 19 pages.**

**INSTRUCTIONS AND INFORMATION:**

**Read the following instructions carefully before answering the questions.**

1. Answer ALL the questions in the ANSWER BOOK provided.

2. Start the answer to EACH question at the top of a NEW page.

3. Number the answers correctly according to the numbering system used in this question paper.

4. Present your answers according to the instructions of each question.

5. If answers are not presented according to the instructions of each question, candidates will lose marks.

6. ALL drawings should be done in pencil and labelled in blue or black ink.

7. Draw diagrams or flow charts only when requested to do so.

8. The diagrams in this question paper may NOT necessarily be drawn to scale.

9. The use of graph paper is NOT permitted.

10. Non-programmable calculators, protractors and compasses may be used.

11. Write neatly and legibly. Candidates will lose marks for slovenly and illegible work.

**SECTION A**

**QUESTION 1**

1.1 Various options are provided as possible answers to the following questions. Choose the most correct answer and write only the letter (A to D) next to the question number (1.1.1 – 1.1.10) in the ANSWER BOOK, for example

1.1.8 D.

1.1.1 Reproduces through binary fission:

A Virus B Fungi

C Bacteria D Moss

1.1.2 Which of the following produce antibodies?

A Blood plasma B Lymphocytes

C Macrophages D Red blood cells

1.1.3 The evolutionary history of an organism is known as its…

A taxonomy B philosophy

C phylogeny D morphology

1.1.4 Which of the following is a characteristic feature of mosses?

A Xylem B Phloem

C Seeds D Spores

1.1.5 In which of the following plant groups do male gametes depend on water/moisture to swim towards the ovum?

A Pteridophytes and Gymnosperms B Pteridophytes and Angiosperms

C Bryophytes and Pteridophytes D Bryophytes and Gymnosperms

1.1.6 Gymnosperms are more evolved for terrestrial life because:

A they reproduce by spores B they have true roots and leaves

C their sperm are motile D they produce seeds

1.1.7 The first animal phylum on the evolutionary tree with three tissue layers that developed from the embryo is…

A Cnidaria B Plathyelminthes

C Chordata D Porifera

1.1.8 In which pairs of phyla below do the animals have a through gut?

A Cnidaria and Porifera B Chordata and Porifera

C Platyhelminthes and Annelida D Arthropoda and Chordata

1.1.9 Which of the following will make up a balanced diet?

A Mineral salts, vitamins, carbohydrates, no fats, proteins, water,

 roughage

B Mineral salts, vitamins, glucose, fats, water, roughage

C Mineral salts, vitamins, carbohydrates, fats, proteins, roughage, water

D Vitamins, carbohydrates, fats, proteins, water, fiber.

1.1.10 Diet for vegans include:

A fruits, vegetables, pulses B eggs, no dairy, no meat, pulses

C honey, pulses, eggs, fruit D dairy, no meat, no fish, fruits

 (10 × 2) **(20)**

**1.2 Give the correct biological term for each of the following descriptions.**

 **Write only the term next to the question number (1.2.1 to 1.2.6) in the ANSWER BOOK.**

1.2.1 Formation of ATP from ADP during the light phase of photosynthesis.

1.2.2 The rhythmical contraction of the muscles in the alimentary canal causing food

to move along the gut.

**1.2.3** Plants that produce only one kind of spore.

1.2.4 In angiosperm plants, the walls of the ovary form this part.

1.2.5 A rod of cells along the dorsal side of chordate embryos.

1.2.6 The germ layer in animals that gives rise to reproductive organs

 (6 × 1)  **(6)**

1.3 Indicate whether each of the statements in COLUMN I applies to **A ONLY**, **B ONLY**, **BOTH A AND B**, or **NONE** of the items in COLUMN II. Write **A only, B only, Both A and B, or none** next to the question number (1.3.1 to 1.3.7) in the ANSWER BOOK.

|  |  |
| --- | --- |
| COLUMN 1STATEMENT OR DESCRIPTION | COLUMN IIITEM |
| 1.3.1 | All organisms in this phylum aresessile | A |  Porifera |
| B | Chordata |
| 1.3.2 | Root-like structure in moss plants | A | Thallus  |
| B | Rhizoids  |
| 1.3.3 | Management of malaria | A | Insect nets |
| B | DDT |
| 1.3.4 | Role of antigens in the body’s defense | A | Trigger an immune response |
| B | Bind to the invading pathogen |
| 1.3.5 | Digestive juice | A | Saliva |
| B | Bile |
| 1.3.6 | Beneficial effect of certain bacteria | A | Nitrogen fixing |
| B | Making wine |
| 1.3.7 | The dominant generation in flowering plants | A | Gametophyte |
| B | Sporophyte |

 (7 × 2) **(14)**

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



1.4.1 Give the **scientific name** for this diagram. (1)

1.4.2 Name one phylum in which the animals are mostly **radial symmetrical**. (1)

1.4.3 Which phylum was the **first to evolve** into bilateral symmetrical organisms? (1)

1.4.4 Is *Annelida* **more related** to *Arthropoda* or *Platyhelminthes*?

 Give a **reason** for your answer. (2)

1.4.5 Name the phylum that **evolved last**. (1)

1.4.6 Which **number** on the diagram represents the following?

 a) The common ancestor? (1)

 b) The first point of diversion? (1)

1.4.7 Give **one example** of an organism that can be found in the following phyla:

 a) Cnidarians (1)

 b) Annelida. (1)

  **(10)**

**TOTAL QUESTION 1: 50**

**TOTAL SECTION A: 50**

**SECTION B**

**QUESTION 2**

2.1 The following diagram indicates different shapes found in a specific type of

 micro-organism. Study the diagram and answer the questions based on it.



2.1.1. **Identify** the type of micro-organism. (1)

2.1.2. Draw a **labelled diagram** indicating the structure of a typical bacillus. (5)

 **(6)**

2.2. The following flow chart shows the life cycle of the malaria parasite.



2.2.1. Name the species of mosquito that acts as the **vector** for the malaria parasite.

(1)

2.2.2. Name the two different types of **body cells** that the *Plasmodium* parasite

 attacks. (2)

2.2.3. Why would people die if they contract malaria? (1)

2.2.4.

|  |
| --- |
| DDT to Control Malaria?DDT is a pesticide that was used to control mosquito populations in malaria areas. In the early 1990’s, there was a worldwide ban on the use of DDT. The number of deaths due to malaria in South Africa rose from about 19 in 1991 to over 450 in the year 2000. The government decided to lift the ban and is using DDT again under controlled conditions. |

 a) Explain why DDT was banned in 1990. (2)

 b) Do you think the South African Government made the right decision to

 **unban** DDT? Give a **valid reason** for your answer. (1)

 **(7)**

2.3. The graph below shows the growth of yeast in wine over a period of time.

**Growth of yeast in wine over a period of 20 days**



2.3.1. Explain the **purpose** of yeast in the production of wine. (3)

2.3.2. Explain the **growth** of the yeast from day 1 to day 5. (2)

2.3.3. Explain why the growth of the yeast **slows down and stops** completely after

 20 days. (2)

 **(7)**

2.4. Study the diagrams A to C, which show three different types of terrestrial plants.

 All of these plants have lived on land for at least 360 million years. Study the

 diagram and answer the questions based on it.

  

 A B C

2.4.1. Discuss these plants A, B and C under the following headings:

 a) Phylum. (3)

 b) Apart from the vascular tissue, what other **structural differences** do the

 **leaves** of these three plants exhibit? Discuss at least two different features

 of each plant’s leaves. (6)

 c) Reproductive structures. (3)

 **(12)**

2.4.2. The following diagram indicates the structure of a hibiscus flower.



 Match each of the following with one of the numbered parts of the diagram.

 Write only the letter and applicable number down, e.g. F - 14

 A – Attracts pollinators

 B – Female organ

 C – Produces pollen

 D – Receives pollen

 E – Protects flower while in bud (5)

2.4.3. What is meant by **double fertilization** of the flowers of angiosperms? (3)

 **(8)**

**TOTAL QUESTION 2: 40**

**QUESTION 3**

3.1. The diagram below shows a model that has often been used to explain the process

 of photosynthesis. Study the model carefully and then answer the following questions about it.



3.1.1. What **organelle** in a plant is represented by the structure labelled 1? (1)

3.1.2. In the model radiant energy is converted into kinetic energy. What form of

 energy is it **converted** **into** in the real process? (1)

3.1.3. The belt is providing energy to the dark reaction box. What **chemical compound**

 provides this energy in the real system? Shortly describe **how** this compound is formed. (3)

3.1.4. A co-enzyme is needed to transfer a certain **element** to the dark reaction box

 as indicated by number 2. Identify this element. (1)

3.1.5. **Identify** the substance B, entering from the atmosphere. (1)

3.1.6. Name the **byproduct** A. (1)

3.1.7. Name the **product** that eventually **results** from the dark reaction box. (1)

 **(9)**

3.2. The following diagram represents a potted plant with **variegated** leaves. The plant was destarched and then prepared for investigation as indicated by A and B respectively. After the plant has been exposed to sunlight for a period of six hours, the two leaves were tested for the presence of starch. Study this diagram and then answer the question that follow:



3.2.1. What is the **aim** of investigation A? (1)

3.2.2. List **TWO** factors being tested in B. (2)

3.2.3. Make **THREE** drawings of the leaf used in investigation B, shading the areas where starch will be **present**:

 a) before the leaf was destarched

 b) after the leaf was destarched

 c) after the leaf was exposed to sunlight (3)

 **(6)**

3.3. Study the graph below showing the optimal CO2 concentration for different light intensities and answer the questions set.

**Graph showing the optimal light intensities for photosynthesis**

**In a greenhouse at different CO2 concentrations**



3.3.1. What **effect** did an initial increase in the CO2 concentration have on the rate of photosynthesis? (2)

3.3.2. What **other** factor seemed to have influenced the maximum rate of

 photosynthesis? (1)

3.3.3. Why did a continuous increase in CO2 level lead to a **stabilizing** of the rate of photosynthesis at all three light intensities. (2)

 **(5)**

3.4. The diagram represents part of the human digestive system. Answer the questions based on it.



3.4.1. Name the **organs** labelled 3 and 4 (2)

3.4.2. Name the **digestive juice** secreted by part 4 and part 7 respectively. (2)

3.4.3. If the structure numbered 6 were cut through, it can be deduced that

 **digestion** of food will be **affected**, but there would be **no signs** of

 diabetes mellitis. Explain these two deductions. (5)

3.4.4. List **THREE** characteristics that an absorption surface must have. Next to each

 characteristic write down **how** the structure of the small intestines complies to it.

 (6)

 **(15)**

3.5. Study the energy content of processed food as it appears on the labels

 indicated in the following table.

|  |  |
| --- | --- |
| FOOD | Amount of energy per 100 grams (kJ) |
| Brown bread | 1000 |
| Mealiepap | 1274 |
| Roast chicken | 950 |
| Peanut butter | 2350 |
| Carrots | 100 |
| Bananas | 384 |
| Milk | 153 |
| Sugar | 1650 |

3.5.1. Which type of **food** in the table has the most energy per 100 g? (1)

3.5.2. How much energy will you get if you eat 50 g brown bread? (1)

3.5.3. **Calculate** how much energy Portia would get from the following meal:

* two slices of brown bread weighing 60 g,
* a spoon full of peanut butter weighing 10 g
* a glass of milk weighing 200 g

 **Show your working**. (3)

 **(5)**

**TOTAL QUESTION 3: 40**

**TOTAL SECTION B: 80**

 **SECTION C**

**QUESTION 4**

Some **invertebrates** play an important **role** in agriculture and the environment.

**Do you agree** that the disappearance of invertebrates would lead to the

disappearance of humans? **Discuss** the statement and the **role of arthropods** in ecosystems and agriculture.(17)

 **Synthesis**  (3)

 **(20)**

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

**TOTAL QUESTION 4: 20**

**TOTAL SECTION C: 80**

**GRAND TOTAL 150**

|  |  |
| --- | --- |
| **GRID COMMON JUNE EXAM**  **GRADE11 2015** |  |
|  | **Cognitive Levels** | **SPECIFIC AIMS** | **Knowledge Strands** |
| **Question nr** | **A** | **B** | **C** | **D** | **SA1** | **SA2** | **SA3** | **Molecular, Cellular, Tissues** | **Life Processes**  |
|  | Basic knowledge | Comprehension | Application | Analysis, Synthesis & Evaluation | Knowledge | Process skills | Science & Society | Biodiversity and classification of microorganisms | Biodiversity in plants and reproduction | Biodiversity of animals |  |  | Photosynthesis  | Animal nutrition  |  |
| 1.1 | 20 |  |  |  | 20 |  |  | 4 | 6 | 6 |  |  |  | 4 |  |
| 1.2 | 6 |  |  |  | 6 |  |  |  | 2 | 2 |  |  | 1 | 1 |  |
|  1.3 |  | 14 |  |  |  | 14 |  | 6 | 4 | 2 |  |  |  | 2 |  |
| 1.4 | 3 |  | 1 | 6 | 3 | 7 |  |  |  | 10 |  |  |  |  |  |
| **Total Quest 1** | **29** | **14** | **1** | **6** | **29** | **21** |  | **10** | **12** | **20** |  |  | **1** | **7** |  |
| 2.1 | 6 |  |  |  | 1 | 5 |  | 6 |  |  |  |  |  |  |  |
| 2.2 | 4 | 2 |  | 1 | 6 |  | 1 | 7 |  |  |  |  |  |  |  |
| 2.3  |  | 3 | 4 |  | 3 | 4 |  | 7 |  |  |  |  |  |  |  |
| 2.4 | 6 | 6 | 8 |  | 20 |  |  |  | 20 |  |  |  |  |  |  |
| **Total Quest 2** | **16** | **11** | **12** | **1** | **30** | **9** | **1** | **20** | **20** |  |  |  |  |  |  |
| 3.1 | 4 | 3 | 2 |  |  | 9 |  |  |  |  |  |  | 9 |  |  |
| 3.2 | 2 | 1 | 3 |  | 3 | 3 |  |  |  |  |  |  | 6 |  |   |
| 3.3 |  | 5 |  |  |  | 5 |  |  |  |  |  |  | 5 |  |  |
| 3.4 | 4 | 6 | 5 |  | 15 |  |  |  |  |  |  |  |  | 15 |  |
| 3.5 |  |  |  | 5 |  | 5 |  |  |  |  |  |  |  | 5 |  |
| **Total Quest 3** | **10** | **15** | **10** | **5** | **18** | **22** |  |  |  |  |  |  | **20** | **20** |  |
| 4.1 |  |  | 20 |  |  | 20 |  |  |  | 20 |  |  |  |  |  |
| **Total Quest 4** |  |  | **20** |  |  | **20** |  |  |  | **20** |  |  |  |  |  |
| Quest 1 | **29** | **14** | **1** | **6** | **29** | **21** |  | **10** | **12** | **20** |  |  | **1** | **7** |  |
| Quest 2 | **16** | **11** | **12** | **1** | **30** | **9** | **1** | **20** | **20** |  |  |  | **20** | **20** |  |
| Quest 3 | **10** | **15** | **10** | **5** | **18** | **22** |  |  |  |  |  |  |  |  |  |
| Quest 4 |  |  | **20** |  |  | **20** |  |  |  | **20** |  |  |  |  |  |
| **Total** | **55** | **40** | **43** | **12** | **27** | **72** | **1** | **30** | **32** | **40** |  |  | **21** | **27** |  |
| **Norm** | **40%** | **25%** | **20%** | **15%** |  |  |  | **20%** | **21%** | **27%** | **%** | **%** | **14%** | **18%** | **%** |
| **Marks** | **55** | **40** | **43** | **12** |  |  |  | **30** | **32** | **40** |  |  | **21** | **27** |  |
| **Total** | **150** | **150** | **150** |

Date: 4 May 2015 Signature: Examiners. **R. Ferreira and H. Germishuys**

Date:………………………………… Signature: Moderator………………………………….