

**Biology and Health sciences**

 **18/06/2021**

**8h30 am -11h30am**

**SENIOR TWO END OF YEAR EXAMINATIONS, 2020/2021**

**SUBJECT: BIOLOGY AND HEALTH SCIENCES**

|  |
| --- |
|  **Marks:** |

 **/100**

**DURATION: 3 HOURS**

**INSTRUCTIONS:**

1) Do not open this question paper until you are told to do so.

2) Answer all questions in section A. **(70 mark)**

3)Answer three questions in section B. **(30 marks)**

4)Use only a **blue** or **black** pen.

 **SECTION A: Attempt all questions (70 marks)**

1) Identify any five functions of the Liver in the human body. **(5 marks)**

2) Explain why it is biologically advisable to carry out physical exercises regularly.

 **(3 marks)**

3) How can drug abuse affect your health?  **(4 marks)**

4) Copy and complete the paragraph below using the following words:

Carbondioxide, cholorophyll, Energy, gas, glucose, light, oxygen, water.

During Photosynthesis……………………..energy is absorbed by ………………, a substance found in the chloroplasts. This …………………..is then used to convert……………….from the air and………………….from the soil into a simple sugar called………………

…………………is also produced and released as………………………

 **(8 marks)**

5) The diagrams below represent two organisms in Kingdom Animalia. Observe them carefully and then answer the questions that follow.

****

a) State the phylum and class of each organism.

 Organism A

 Phylum……………………………………………..

 Class………………………………………………..

 **(2 marks)**

 Organism B

 Phylum……………………………………………..

 Class………………………………………………..

 **(2 marks)**

b) State two observable characteristics features which are common to both organism A and B.

  **(2 marks)**

6) Complete the table below using √ if the structure is present and X if it is absent in the

 respective Animal and plant cells.

|  |  |  |
| --- | --- | --- |
| **Structure** | **Animal cell** | **Plant cell** |
| Nucleus |  |  |
| Cytoplasm |  |  |
| Cell wall |  |  |
| Cell Membrane |  |  |
| Permanent Vacuole |  |  |

  **(5 marks)**

7) A student in Senior Two carried out the following tests to investigate the food substances

 present in a given food sample.

1. Identify the observation at (a), (b) and (c) if all tests were positive.

|  |  |  |
| --- | --- | --- |
| **Test procedure** | **Observation** | **Deductions** |
| (i) To 1 cm3 of Solution containing starch in attest tube, add 2-3 drops of Iodine solution | (a) | Starch is present |
| (ii) To 1 cm3 of Solution containing glucose on a test tube, add 1 cm3 of Benedicts Solution and boil. | (b) | Reducing sugar present |
| (iii) To 1 cm3 of Solution, add dilute hydrochloric acid and heat. Cool under cold water, add Sodium hydroxide Solution and then add 1 cm3 of Benedicts Solution and boil. | (c) | Non reducing sugar present |

 (6 marks)

1. When testing for non-reducing sugars, give one reason why each of the following was added.

(i) Dilute hydrochloric acid  **(1 mark)**

(ii) Sodium hydrochloric solution  **(1 mark)**

8) Name parts that:

(a) Attaches a bone to bone  **(1 mark)**

(b) Attaches bones to muscles **(1 mark)**

(c) Acts as a shock absorber where two bones articulate. **(1 mark)**

9) Match the following pathogen with the disease they cause.

Pathogens Disease

1. Vibrio cholera a) Malaria
2. Plasmodium b) AIDS
3. Human Immunodeficiency virus c) Cholera
4. Salmonella typhus d) Typhoid

 **(4 marks)**

10) State five ways in which the alveoli are suited for their functions in humans.

 **(5 marks)**

11) Suggest at least four ways how HIV is transmitted from an infected person to a healthy

 person. **(4 marks)**

 **SECTION B: Attempt any three questions (30 marks)**

12 a) What do you understand by the following terms:

1. Turgidity **(2 marks)**
2. Plasmolysis **(2 marks)**

 b) Distinguish between transpiration and Evaporation. **(2 marks)**

 c) How are Xerophytes adapted to avoid excess water loss? **(4 marks)**

13) The diagram below shows a feeding relationship that exists in an aquatic ecosystem.



1. Which Feeding relationship is shown on the diagram above? **(2 marks)**
2. To which group of organisms does octopus, crab and Starship belong. **(2 marks)**
3. Which organism is a producer on the diagram?  **(2 marks)**
4. In which trophic level does seal and seagull belong? **(2 marks)**
5. What role is played by seaweed in this ecosystem?  **(2 marks)**

14) The diagram below shows a human Urinary system. Use it to answer the questions that

 follow.

 

 a) Name the parts A,B,C,D,E,F,G,H and I **(4 marks)**

 b) State the Function of D and E **(2 marks)**

 c) Name the substance that is

 (i) Present in the Urine and human sweat **(2 marks)**

 (ii) Present in blood but absent in Urine **(2 marks)**

15) Explain how the following ways help to prevent the spread of diseases.

 a) Use of condom during sexual intercourse

 b) Washing hands before preparing salads

 c) Boiling water for drinking and keeping it in clear container

 d) Putting your hand in front of your mouth while coughing

 e) Avoid staying with hens and rabbits in the same house.

 **(10 marks)**

**SECTION C (Compulsory) 15 marks**

16) The experiment below is used to demonstrate a biological process.



Visking tubing is made of material which acts as a semi-permeable membrane. After sometime, water from the beaker entered the Visking tubing and water in the beaker became salty. The temperature of the experiment was kept between 35 o C and 40o C throughout the experiment.

a) By what process has water entered the visking tubing? **(1 mark)**

b) Give an example of the process above occurring in (i) Animals

 (ii) Plants

 **(4 marks)**

c) By what process has salt (Sodium chloride) entered the beaker.

 Give an example of the process in (C) above occurring in (i) Animals

 (ii) Plants

1. **marks)**

 d) Identify one or more substances you think has entered the water in the beaker by the same

process as salt. **(1 mark)**

 (e) Explain why osmosis is considered as a special case of diffusion. **(4 marks)**

**MARKING GUIDE COMPREHENSIVE ASSESSMENT BIOLOGY S2\_2020**

1. –Regulation of blood sugar

-Deamination of excess aminoacids

-Formation of bile

-Storage of glycogen

-Destruction of blood cells (Old red blood cells)

-Storage of Iron

-Storage of some vitamin

-Formation of new blood cells in babies.

 **Any five: 5 marks**

1. –Stabilise blood sugar levels

-Facilitates elimination of Metabolic wastes products through sweating

-Reduces cholesterol levels in the body

-It encourages loss of weight especially in obese people

-Helps to avoid cardiovascular diseases.

 **Any three: 3 marks**

1. –Drugs affect the nervous system especially brain

- Destroy liver cells

-Leads to lack of judgement which results in wrong or dangerous decisions

-Leads to serious illness

 **4 marks**

1. During Photosynthesis **Ligh**t energy is absorbed by **Chlorophyll** a substance found in the chloroplasts. This **Energy** is then used to convert **Carbondioxide** from the air and **water** from the soil into a simple sugar called **glucose** . **Oxygen** is also produced and released as **gas.**

 **(8 marks)**

 **5 a) Organism A**

Phylum**: Arthropoda**

Class: **Diplopoda**

 **2 marks**

 **Organism B**

Phylum**: Arthropoda**

Class**: Chilopoda**

 **2 marks**

b) –Both have long segmented bodies

 -Both have more than 10 pairs of jointed legs

 - Both possess a pair of antennae.

 **Any two: 2 marks**

6)

|  |  |  |
| --- | --- | --- |
| **Structure** | **Animal cell** | **Plant cell** |
| Nucleus | **√** | **√** |
| Cytoplasm | **√** | **√** |
| Cell wall | **x** | **√** |
| Cell membrane | **√** | **√** |
| Permanent vacuole | **x** | **√** |

 **5 marks**

7 a) (i) The solution changes from **blue** to **black 2 marks**

 (ii) The solution changes from **blue** to **green** then **yellow** and finally **orange** (reject

 wrong order of colour) **2 marks**

 (iii) The solution changes from **blue** to **green** then **yellow** and **orange 2 marks**

 b) (i) Hydrolysis non-reducing sugars to reducing sugars **1 mark**

(ii) To neutralize the acid **1 mark**

8 a) Ligament **1 mark**

b) Tendon  **1 mark**

c) Synovial fluid  **1 mark**

9 ) 1 c

 2 a

 3 b

 4 d

 **4 marks**

10) –Large surface area

 -Dense network of blood capillaries

 -Moist

 -Thin walled

 -Good ventilation

 **5 marks**

11) –Unprotected sex with infected person

 -Sharing unsterilized sharp objects

 -Blood transfusion

 -Mother to child during birth or breast feeding

 **4 marks**

12 a) **Turgidity**: Cells absorb water and excerts turgor pressure on the

 cytoplasm membrane which extends to its maximum limit.

 The cell becomes firm, rigid and strong.

 **2 marks**

 **Plasmolysis:** The cell loses water and the cytoplasm membrane pulls

 away from the cell wall resulting in shrinking of the

 cell. The cell becomes small, weak and flaccid.

 **2 marks**

 b) Transpiration is the loss of water in form of water vapour from the plant

 leaves through the stomata to the atmosphere whereas evaporation is the

 loss of water vapour from any surface that contains water to the

 atmosphere.

 c) –They have reduced surface area of the leaves

 - Have folded leaves, needle like, spine, scale leaves

 -Some shed off their leaves during drought

 -Some have hairly leaves

 -Have reduced number of stomata

 -Have thick waxy cuticle

 -Have sunken stomata

 **Any four: 4 marks**

13 a) Food web  **2 marks**

b) Secondary consumer **2 marks**

c) Seaweed  **2 marks**

d) Tertiary consumers/Last order consumers **2 marks**

 e) Primary producer **2 marks**

14 a) A: Aorta

 B: Renal artery

 C: Left kidney

 D: Ureter

 E: Urinary bladder

 F: Sphincter muscle

 G: Urethra

 H: Renal vein

 I : Posterior Vena cava.

 **4 marks**

b) D-Passage of urine from kidney to the bladder.

 E: Stores urine before it is discharged

 **2 marks**

c) (i) –Excess water

 -Excess salts

 -Urea

 **Any two: 2 marks**

 (ii) –Glucose

 -Amino acids

 -Plasma protein **any two: 2 marks**

15 a) Condoms act as barrier to prevent direct contact of the body fluids

 and the body. **2 marks**

 b) Washing hands cleans off microorganisms that cause diseases such

 as bacteria. **2 marks**

 c) Boiling kills pathogen and keeping it in clean container avoids

 contamination. **2 marks**

 d) It reduces/minimizes risks to spread the disease to people you are

 close to/reduces infecting other people. **2 marks**

 e) Some animals are vectors of diseases whereas other are affected by

 the same diseases as human. When this(staying with animals in the

 house) is avoided, the risk of spreading diseases is reduced. **2 marks**

16 a) Osmosis **1 mark**

 b) (i) Osmosis in Animals

 - Absorption of water in Large intestines

 -Reabsorption of water in the nephron

 -Water diffusing by osmosis into red blood cells

 **Any two: 2 marks**

(ii) Osmosis in plants

 -Absorption of water by root hair cells from the soil

 - Movement of water from Xylem to palisade mesophyll cells

 -Movement of water from root hair cells to the Xylem vessel.

 **Any two:2 marks**

 c) Diffusion 1 mark

 (i) Diffusion in Animals

 -Absorption of Mineral ions in the gut

 -Gaseous exchange in the Lungs

 -Reabsorption of glucose in the nephron

 - Absorption of glucose, Amino acids at the Villi

 **2 marks**

 (ii) Diffusion in plants

 -Absorption of Minerals from soil by root hairs

 - Diffusion of 02 and CO2 in Mesophyll cells

 -Diffusion of Minerals from Xylem to Mesophyll cells

 **2 marks**

d) Glucose **1 mark**

e) Osmosis involves movement of water molecules only through a selectively

 permeable membrane. Diffusion involves movement of all substances

 including gases and substances and does not involve a selectively permeable

 membrane.

 **4 marks**



**Biology and Health sciences**

 **18/06/2021**

**8h30 am -11h30am**

**SENIOR TWO END OF YEAR EXAMINATIONS, 2020/2021**

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4) Copy and complete the paragraph below using the following words:

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During Photosynthesis……………………..energy is absorbed by ………………, a substance found in the chloroplasts. This …………………..is then used to convert……………….from the air and………………….from the soil into a simple sugar called………………

…………………is also produced and released as………………………

 **(8 marks)**

5) You are provided with a millipede and a centipede.

a) State the phylum and class of each organism.

 Organism A

 Phylum……………………………………………..

 Class………………………………………………..

 **(2 marks)**

 Organism B

 Phylum……………………………………………..

 Class………………………………………………..

 **(2 marks)**

b) State two characteristics which are common to both a millipede and a centipede

 **(2 marks)**

6) Complete the table below using √ if the structure is present and X if it is absent in the

 respective Animal and plant cells.

|  |  |  |
| --- | --- | --- |
| **Structure** | **Animal cell** | **Plant cell** |
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| Cell wall |  |  |
| Cell Membrane |  |  |
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 **(5 marks)**

7) A student in Senior Two carried out the following tests to investigate the food substances

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1. Identify the observation at (a), (b) and (c) if all tests were positive.

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 (6 marks)

1. When testing for non-reducing sugars, give one reason why each of the following was added.
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 **SECTION B: Attempt any three questions (30 marks)**

12 a) What do you understand by the following terms:

1. Turgidity **(2 marks)**
2. Plasmolysis **(2 marks)**

 b) Distinguish between transpiration and Evaporation. **(2 marks)**

 c) How are Xerophytes adapted to avoid excess water loss? **(4 marks)**

13) a) Define the term ecosystem. **(2 marks)**

 b) What are the tertiary consumers? **(2 marks)**

 c) What is the role of producers in an ecosystem. **(6 marks)**

14) a) Name at least eight parts of the urinary system. **(4 marks)**

b) Sate the function of any two parts you have named above. **(2 marks)**

 c) Name the substance that is

 (i) present in the urine and human sweat **(2 marks)**

 (ii) Present in blood but absent in urine. **(2 marks)**

15) Explain how the following ways help to prevent the spread of diseases.

 a) Use of condom during sexual intercourse

 b) Washing hands before preparing salads

 c) Boiling water for drinking and keeping it in clear container

 d) Putting your hand in front of your mouth while coughing

 e) Avoid staying with hens and rabbits in the same house.

 **(10 marks)**

**SECTION C (Compulsory) (15 marks)**

16) a) A visking tubing was filled with Sodium chloride solution and put in a beaker containing pure water. After some time, the water in the beaker became salty.

a) By what process has water entered the visking tubing? **(1 mark)**

b) Give an example of the process above occurring in (i) Animals

 (ii) Plants

 **(4 marks)**

c) By what process has salt (Sodium chloride) entered the beaker.

 Give an example of the process in (C) above occurring in (i) Animals

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1. **marks)**

 d) Identify one or more substances you think has entered the water in the beaker by the same

process as salt. **(1 mark)**

 (e) Explain why osmosis is considered as a special case of diffusion. **(4 marks)**

 

**Biology and Health Sciences**

 **25/06/ 2021 08.30 AM - 11.30 AM**

**S2 END OF YEAR EXAM, 2020/2021**

**SUBJECT: BIOLOGY**

**ALTERNATIVE TO PRACTICAL EXAMINATION (20 marks)**

**Instructions**

This paper consists of one question and is compulsory

1) You are provided with the following apparatus and chemical.

* Beaker
* Straw
* Water
* Potassium manganate (VII): KMnO4

(i) You are required to demonstrate an experiment of Diffusion in Liquids.

 **(15 marks)**

(ii) Describe the process and factors of diffusion. **(5 marks)**