**BIOLOGY**

**29/06/2021 08.30 AM - 11.30 AM**

**28/11/2017 08.30 AM - 11.30 AM**



**S4 END OF YEAR EXAM, 2020/2021**

**SUBJECT: BIOLOGY**

**COMBINATIONS: - PHYSICS-CHEMISTRY-BIOLOGY (PCB)**

**-MATH- CHEMISTRY-BIOLOGY (MCB)**

**- BIOLOGY-CHEMISTRY-GEOGRAPHY (BCG)**

**DURATION: 3 hours.**

**Marks: 100**

**INSTRUCTIONS TO CANDIDATES:**

* Do not open this question paper until you are told to do so.
* **Section A**: Attempt **all** questions. **(70 marks)**
* **Section B:** Attempt any **three** questions of your choice. **(30 marks)**

**SECTION A (Compulsory) (70 marks)**

1. The following table shows some plant species in Gako Forest.

|  |  |
| --- | --- |
| Tree species | Numbers |
| A | 56 |
| B | 48 |
| C | 12 |
| D | 6 |
| E | 3 |

(i) Calculate the Simpson’s diversity index of the above forest. **(2 marks)**

(ii) Explain why a habitat with high diversity is thought to be more stable.

1. **marks)**

(iii) Suggest why it is important to maintain biodiversity**. (2 marks)**

2 a) Explain the difference between taxonomy and classification.  **(2 marks)**

b) Why do we study how closely related we are to organisms. **(2 marks)**

3 a) What are the four things that all members of a specie share. **(2 marks)**

b) What are the three features of a natural system of classification.

**(3 marks)**

4 a) What is the difference between magnification and resolution? **(2 marks)**

b) State advantages of an electron microscope over a light microscope.

**(3 marks)**

5 a) Copy and complete the table below which compares the structures of a

typical plant, animal and prokaryotic cell. Use tick (√) if the feature is

present and a cross(X) if it is absent.

|  |  |  |  |
| --- | --- | --- | --- |
| **Structure** | **Plant cell** | **Animal cell** | **Prokaryotic cell** |
| Nucleus |  |  |  |
| Plasmid |  |  |  |
| Mitochondrion |  |  |  |
| Cellulose wall |  |  |  |

b) Suggest why Muscle cells contain a lot of mitochondria whereas most fat

storage cells do not. **(2 marks)**

6) Describe how you would test a liquid sample for the presence of lipid

and how you would recognize a positive result. **(3 marks)**

7) Describe how the structures of starch and cellulose molecules are related to

their functions. **(4 marks)**

8) Fats and glycogen are energy storage compounds in animals.

a) Compare the suitability of the two substances as storage compounds.

**(3 marks)**

b) State the advantages of storing fat over glycogen. **(3 marks)**

c) Why is glycogen a more suitable energy compound in muscles that fat?

**(3 marks)**

9) The figure below represents a polypeptide made up of seven amino acids, A-G.

|  |
| --- |
|  |

A B C D E F G

1. What is the chemical formula of the group represented by the box?

**(1 mark)**

1. How many molecules of water would be produced in forming this polypeptide? **(1 mark)**
2. Give the difference between globular and fibrous proteins. **(2 marks)**

10 a) Name the gaseous exchange surface in:

1. Humans **(1 mark)**
2. Plants **(1 mark)**
3. Fishes **(1 mark)**

b) Explain how efficient gas exchange is achieved in plants. **(2 marks)**

11) Explain why a gas exchange surface must be

(i)rich in blood supply **(1 mark)**

(ii)thin walled **(1 mark)**

(iii) moist  **(1 mark)**

12) Cholera bacteria release the toxin, choleragen, when they are in the intestine.

a) What is the name of the bacteria that causes cholera? **(1 mark)**

b) Describe the way in which cholera is transmitted from an infected person to uninfected person. **(3 marks)**

13 a) How do microorganisms cause food to spoil? **(3 marks)**

b)Suggest the range of methods used to keep food fresh. **(4 marks)**

14) Discuss why Locomotion is important to animals. **(5 marks)**

**SECTION B (30 MARKS)**

15) Explain how lungs are adapted to their functions as respiratory organ.

**(10 marks)**

16) A wide range of products are produced as a result of the action of microbes. Discuss this statement with reference to the manufacture of Two items of food or drink from the following list: bread; butter; cheese; yoghurt; beer; vinegar.

**(10 marks)**

17) Discuss the various biological functions of water to plants and animals.

**(10 marks)**

18 a) Suggest why the true total AIDS cases worldwide may be much higher than reported **(2 marks)**

b) Suggest why condoms are not fully effective at preventing HIV infection.

**(2 marks)**

c) What advice can you give as part of an AIDS Education programme.

(**6 marks)**