**P530/2**

**Biology**

**Paper 2**

**2 ½ hours**

**Uganda Advanced Certificate of Education**

**PRE- REGISTRATION EXAMINATIONS 2016**

**BIOLOGY THEORY**

**PAPER 2**

**2 HOURS 30 MINUTES**

**Instructions:**

* Answer question 1 in section A plus any three other questions in section B.
* Candidates are advised to read the questions carefully, organise their answers and present them logically and precisely, illustrating with well labeled diagrams where necessary.

**SECTION A (40 MARKS)**

1. a) The table below shows the effect of varying the partial pressure of oxygen on the percentage (%) saturation of haemoglobin from a mammalian goat which lives at an altitude of 5000m in the mountains and from another goat which lives at sea level.

|  |  |  |
| --- | --- | --- |
| **Partial pressure of Oxygen(mmHg)** | **% saturation of haemoglobin** | |
|  | Goat at 5000m | Goat at sea level |
| 0 | 0 | 0 |
| 20 | 60 | 15 |
| 40 | 86 | 55 |
| 60 | 95 | 80 |
| 80 | 100 | 94 |
| 100 | 100 | 100 |

a) Using the same axis, plot Oxygen dissociation curves for the haemoglobin of both of these mammals. (13 marks)

b) Give two regions in the body of these animals where;

i) Oxygen levels are very high (2 marks)

ii) Carbon dioxide are very high (2 marks)

c) What is the significance of the reversible binding reaction of haemoglobin to Oxygen in mammals? (4 marks)

d) Describe how haemoglobin saturation is affected by Oxygen levels in the blood of mammals. (2 ½ marks)

e) What is the significance of the relationship in (d) above to Oxygen delivery to the tissues? (2 ½ marks)

1. b) The graph below shows how partial pressure of Oxygen varies with altitude.

20

***Altitude / m X 103***

15

10

5

14

12

10

8

6

4

2

***Partial pressure of oxygen/KNm-2***

a) The oxygen dissociation curve for haemoglobin of the goat is typical of most mammals which live at low altitudes. Explain the advantages to the goat living at 5000m in having a different Oxygen dissociation curve for its haemoglobin. (4 marks)

b) With reference to the effects of altitude above,

i) Outline the general effects of high altitude on the body of man. (2 marks)

ii) Identify the term used to describe these effects. (1 mark)

c. i) Give a short physiological adaptation that man makes at high altitude.

(1 mark)

ii) How does the adaptation in c (i) help to increase the amount of Oxygen the body receives? (2 marks)

d. i) Give a long term adaptation that man can make to live at high altitude.

(2 marks)

ii) How does the adaptation in d(i) help to increase the amount of Oxygen the body receives? (2 marks)

**SECTION B**

2. a) What is meant by alternation of generation? (2 marks)

b) Describe the alternation of generation of a named moss. (10 marks)

c) Explain the problems faced by plants from aquatic environment to terrestrial environment. (8 marks)

3. a) Describe the properties of DNA that make it a suitable hereditary material. (5 marks)

b) Explain how DNA influences the synthesis of proteins in a cell.

(15 marks)

4. a) State and explain the conditions required for germination to occur.

(5 marks)

b) Outline the events that take place during the process of germination.

(10 marks)

c) How is growth and development controlled in living organisms? (5 marks)

5. a) Give an account of the fluid mosaic model of the cell membrane.

(10 marks)

b) Why is transport across the cell membrane essential for all organisms?

(6 marks)

c) How is support achieved in non-woody plants? (4 marks)

6. Describe the;

a) role of the pancreas in the digestion of food and metabolism of absorbed products. (9 marks)

b) Control of digestive juice secretion along the alimentary canal in humans.

(11 marks)

***\*\*\*END\*\*\****