**OPENER EXAM -TERM 1, 2023**

**BIOLOGY FORM 3**

**50 MARKS.**

**TIME 1HR 30 MINUTES**

 **MARKING SCHEME**

1. a). State **two** functions of the kidney 2MRKS

 **Excretion;**

 **- Osmoregulation;**

b). Name **two** substances that are not found in urine of a healthy person 2MRKS

 **– Glucose**

 **- Amino acids**

 (c) Name **two** diseases that affect the kidney 2MRKS

 **Nephritis;**

 **- kidney stones /Gall stones;**

1. State **three** structural modification of the kidneys of deserts animals like kangaroo rat.

 3MRKS

 **Extralong loop of Henle; Have fewer and smaller glomeruli;**

 (b) Describe how ingestion of very salty food may reduce the amount of water excreted in urine. 2MRKS

 **Salty food increased the salt concentration in blood; Blood becomes hypertonic to kidney tubules; more water is reabsorbed from kidney tubules; hypertonic urine is thus produced**

1. A student mixed a sample of urine from a person with Benedict’s solution and heated, the colour changed to orange.
2. What was present in the urine sample? 1MRK

 **Glucose;**

1. What did the student conclude on the health status of the person? 1MRK

**The person was a sufferer of diabetes mellitus;**

1. Which organ in the person may not be functioning properly? 1MRK

 **Pancrease;**

1. Distinguish between diabetes mellitus and diabetes inspidus 2MRKS

 **Diabetes mellitus**

**- Caused by failure of the pancreas to secrete enough insulin;**

**- High glucose concentration in the blood than normal;**

 **Diabetes insipidus**

**- Inability of the pituitary gland to secret sufficient anti-diuretic hormone;**

 **- High concentration of solutes in blood ;**

1. Name **three** processes through which plants excrete their metabolic wastes.

 3MRKS

 Diffusion

**Transpiration;**

**-Shading leaves;**

**-Production of resins and gums;**

1. The equation below represents a metabolic process that occurs in the mammalian liver: Amino acids organic compound + urea
2. Name the process 1MRK

 **Detoxification;**

 (b) What is the importance of the process to the mammals? 2MRK

 **Prevents ammonia from accumulating to toxic levels; which would**

 **affect body functions;**

1. An experiment was carried out to determine the effect of drinking on excess amount of water on the flow of urine. A person drinks one litre of water and urine was collected at intervals of 15minutes.

 The results were as shown below:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time in minutes | 0 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 |
| Urine output ml/min | 1.6 | 1.6 | 1.6 | 5.4 | 9.0 | 9.0 | 7.6 | 3.0 | 0.8 | 0.8 |

1. Plot a suitable graph to represent urine output with time. 7MRKS

 (b) Explain the rate of flow of urine between the following times;

 (i) 15 and 60minutes. 3MRKS

 **The rate increases with time;**

 **Because a lot of water been drunk;**

 **Very little ADH or No ADH produced yet;**

 **No reabsorption taking** place;

 (ii) 60 and 75minutes. 3MRKS

  **The rate remain constant**

 **Pituitary not stimulated to produce ADH**

 **Nephron, less permeable**

 **No water being reabsorbed back to blood**;

 (iii) 75 and 135 minutes. 3MRKS

 **The rate reduces with time;**

 **Little water remaining in blood; due to a lot of water lost through urine;**

 **No water being taken**

1. Name **two** hormones responsible for regulation of relative amount of salts and water in man**. Aldosterone 2MRKS**

 **Antidiuretic hormone**

1. Describe how the mammalian skin regulates body temperature 10 MRKS

**High body temperature above normal: sweat glands: produce sweat: water in the sweat**

 **evaporates/ sweat evaporates: absorbing latent heat of vaporization produces a cooling effect.**

**Hairs lie flat; due to relaxation of erector pilli muscles: no/little air is trapped: [fins increased heat loss from the body; Blood arterioles/vessels; vasodilate/dilates: more blood floss to the skin hence more heat is dispersed by radiation and convection: when the body temperature is low below normal; sweat glands produce less/no sweat: no latent heat is absorbed/more heat is retained in the body; The hairs stand upright/erect: to trap air between them: that insulates the body against at loss; more heat is retained in the body; Blood vessels/arterioles constrict/vasoconstrict: less blood flows to the skin: reduces heat loss/ more heat is retained in the body;**

**Subcutaneous fat/ adipose [issue; beneath the skin insulates the body against heat loss: more heat is retained in the body: (Award 10 mrks)**

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