**Question 35 (20 marks)**

During its development within an egg, a bird embryo first passes through a stage of ammonia excretion followed by a period in which it excretes urea before finally turning to uric acid. An experiment was conducted to measure the amount of each nitrogenous waste produced during incubation of a bird embryo within an egg. The graph below that shows the results of the percentage of total weight of nitrogenous wastes excreted over the 15 day incubation period.

**Refer to the graph and answer the questions below.**

Source Users.rcn.com,. 'Recapitulation'. N.p., 2015. Web. 15 July 2015.

1. State the independent and dependent variables in the experiment. (2 marks)

Independent variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Dependent variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(b) On which day is the % of ammonia and urea excreted by the developing chick identical? (1 mark)

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**Question 35 (continued)**

 (c) On day 10, state the percentages of urea and uric acid that are excreted. (2 marks)

Urea: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Uric Acid: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Use your knowledge of nitrogenous waste products to provide a scientific explanation for the following:

(i) The decrease in ammonia excretion. (2 marks)

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(ii) The trend observed in the excretion of urea and then uric acid. (3 mark)

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**Question 42**

1. Animals have many adaptations that help them to regulate their body

fluids and salt concentrations. Give a named example of a structural, behavioural and physiological adaptation for regulation of salts in animals. For each example explain how the adaptation regulates salt concentration. . (6 marks)

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**Question 27**

The Desert (Spinifex) Hopping Mouse, (*Notomys alexis*), does not drink water. It lives in central Australia where the temperature ranges from -10oC to 70oC. Explain how the mouse can maintain a constant body temperature in such conditions. (10 marks)

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**Question 35 (20 marks)**

(a) State the independent and dependent variables in the experiment. (2 marks)

|  |  |
| --- | --- |
| Description | Marks |
| **Independent variable:** |  |
| Type of nitrogenous waste produced over the period of days of incubation | 1 |
| **Dependent variable:** |  |
| % of total weight of nitrogenous waste excreted | 1 |
| Total | 2 |

(b) On which day is the % of ammonia and urea excreted by the developing chic identical? (1 mark)

|  |  |
| --- | --- |
| Description | Marks |
| Day 5 | 1 |
| Total | 1 |

(c) On day 10, state the percentages of urea and uric acid that are excreted. (2 marks)

|  |  |
| --- | --- |
| Description | Marks |
| Allow 2% variation on either side of the answer |  |
| Urea: 8 % | 1 |
| Uric acid: 92 % | 1 |
| Total | 2 |

(f) (i) The decrease in ammonia excretion. (2 marks)

|  |  |
| --- | --- |
| Description | Marks |
| * Ammonia is highly toxic
* soluble in water
* will diffuses readily into watery surrounding
* the egg is a confined space and the ammonia would be toxic to the developing chick.
 | 1 - 2 |
| Total | 2 |

(ii) The trend observed in the excretion of urea and then uric acid. (3 mark)

|  |  |
| --- | --- |
| Description | Marks |
| * The percentage of urea increases up until day 7, it then declines until day 10.
* From day 10 until hatching (day 15) the % urea excreted remains constant just under 10%.
* From Day 6, the % uric acid excreted rises rapidly to reach just under 90% on Day 10.
* The % uric acid excreted then remains relatively constant until hatching (day 15).
 | 1 - 3 |
| Total | 3 |

**Question 42**

a) Animals have many adaptations that help them to regulate their body

fluids and salt concentrations. Give a named example of a structural, behavioural and physiological adaptation for regulation of salts in animals. For each example explain how the adaptation regulates salt concentration. . (6 marks)

1 mark for example of the adaptation

1 mark for explaining how it regulates salt concentration

x3

6 marks

Examples

Structural

* semipermeable skin of fresh water fish allows water absorption through the skin and ions to be lost through the skin
* semipermeable skin of marine water fish allows ion absorption through the skin and water to be lost through the skin

Behavioural

* marine fish drink a lot of salt water to uptake salt ions and have concentrated urine
* fresh water fish do not drink much water and have dilute urine

Physiological

* marine fish actively excrete salt through the gills
* freshwater fish actively uptake ions through the gills

**Question 27**

Desert hopping mouse is a mammal and regulates its internal body temperature and maintains it within close limits. It is an endotherm. (2 marks)

|  |  |
| --- | --- |
| Response to high temperature (4 Marks Max)  | Response to Low Temperature (4 marks Max) |
| Behavioural avoidance of extremely hot conditions; nocturnal; burrowing | Nesting; crowding |
| Low activity levels | Generate heat through metabolic activity, liver, muscles |
| Blood flow directed to peripheral surfaces (vasodilation) giving heat loss | Blood flow away from peripheral surfaces (vasoconstriction) giving heat conservation |
| Evaporative cooling |  |

1 mark for each and 1 mark for reason