Biology Past Paper Practice

Paper 2, Section A

Data based questions: Calculations
Estimate the oxygen consumption at 20 °C. [1]

Key: ——— = observed  ——- = estimated


1. Identify the mammal with the greatest increase in metabolic rate per degree of temperature, as the temperature decreases. [1]
2. Calculate the average change in the metabolic rate, per degree of temperature, of a weasel as the temperature decreases from 17 °C to −20 °C. Show your workings. [2]
The graph below shows the sodium ion concentration in plant parts of sweet pepper grown in 15 mM sodium chloride for three weeks.

State the concentration of sodium ions in fruits. [1]
Calculate the percentage increase in sodium ion concentration between root and stem. [1]
Urine was collected from the hummingbirds at the three different external temperatures and was analysed to find the concentrations of nitrogenous waste products. The results are shown in the bar chart below.

Calculate the ratio between the concentration of ammonia and the concentration of uric acid at 40 °C. [1]

**Figure 2** below shows the change in mass over the course of the experiment on a particular muscle called the EDL muscle in samples of the treated and control groups of mice.

Calculate the percentage increase in the average mass of the EDL muscle between the treated group and the control group. [2]
Determine the difference in peak contraction force between the treated group and the control group. [1]

Calculate the percentage increase in DNA damage that results when the concentration of LL-37 increases from 2 μmol dm⁻³ to 6 μmol dm⁻³. Show your working. [2]
Calculate the difference between the mean core temperature of animals undergoing C and L treatments. [1]
Measure the level of primary productivity at a depth of 5 m under full sunlight. [1] N03

Based upon the data for full sunlight and sunlight with UVB removed, identify the depth at which there is the

(i) least difference in the development of *P. charcotti*. [1] N03

(ii) most difference in the development of *P. charcotti*. [1] N03
(i) Identify the specific hour during the day with the highest core temperature of rats during the recovery period. [1]
(ii) Identify the lowest core temperature of rats during the control period. [1]

(d) Identify the grass species which produces the most seeds in this area. [1]
(e) Identify the grass species which produces the most seeds in June. [1]
Calculate the change in the percentage of nickel in the dry biomass of *A. lesbiacum* roots when the nickel concentration is increased from 0.1 to 1.0 mmol dm$^{-3}$. [1]