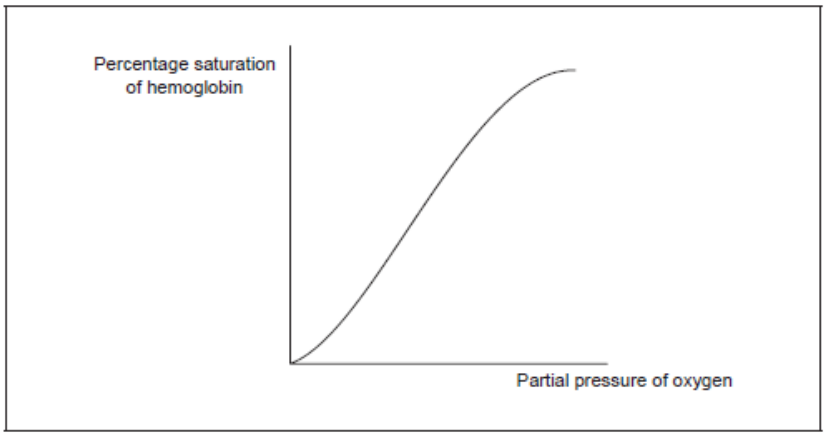
HL Paper 3

Explain ADH secretion and how it is controlled.

Explain the control of ADH secretion.

Describe the control of ADH secretion.

The graph shows the oxygen dissociation curve for adult haemoglobin.



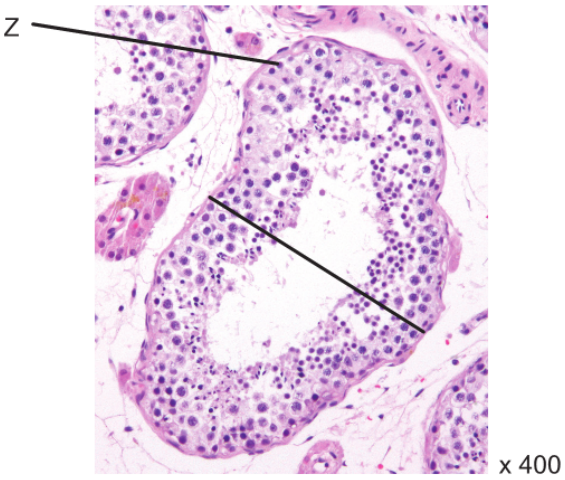
a. State the pathway by which hormones travel from the hypothalamus to the anterior pituitary gland. [1]

b. State the condition of the blood that would stimulate the release of ADH (vasopressin). [1]

d(i) Using the graph, draw a line to show how the oxygen dissociation curve changes with the Bohr shift. [1]

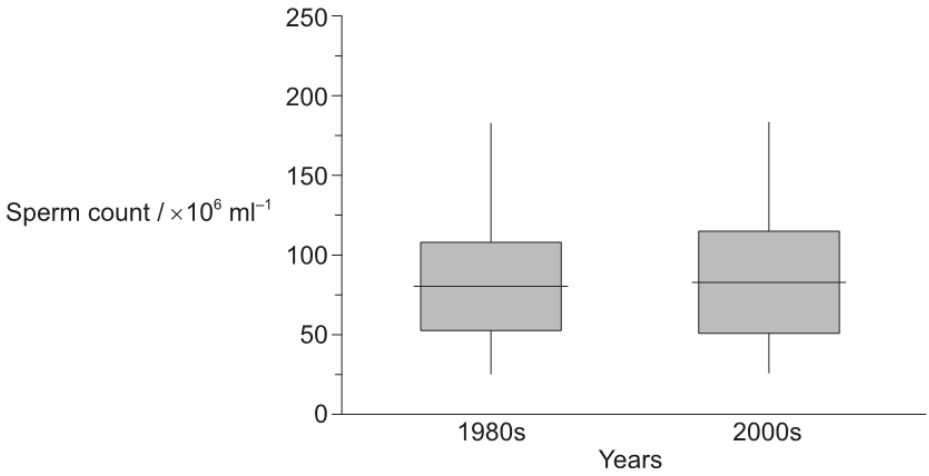
d(ii) Explain the role of the Bohr shift during vigorous exercise. [2]

The light micrograph shows a cross section of seminiferous tubules.



[Source: Micrograph of a seminiferous tubule with sperm by Nephron (https://commons.wikimedia.org/wiki/File:Seminiferous_tubule_and_sperm_low_mag.jpg)]

a. Concerns have been raised about the effect of rising pollution levels on sperm production in men. To investigate the possible effects of pollution on spermatogenesis, sperm samples from men of similar ages were collected in Kolkata in the 1980s and 2000s. The box plot represents the mean and range of sperm counts in the 1980s and 2000s. [3]



[Source: Republished with permission of Elsevier Science and Technology Journals, from 'Semen quality and age-specific changes: A study between two decades on 3729 male partners of couples with normal sperm count and attending an andrology laboratory for infertility-related problems in an Indian city', Dyutiman Mukhopadhyay, Alex C. Varghese, Manisha Pal, Sudip K. Banerjee, Asok K. Bhattacharyya, Rakesh K. Sharma, and Ashok Agarwal, Fertility and Sterility, 93 (7), 2009; permission conveyed through Copyright Clearance Center, Inc]

A hypothesis has been suggested that pollution may have a negative effect on spermatogenesis. Evaluate whether the data support this hypothesis.

b.i. Calculate the actual size of the seminiferous tubule in the area indicated by the line across it, giving the units. [1]

b.ii. Identify the type of cell labelled Z. [1]