WAH YAN COLLEGE, HONG KONG
F6 Biology Mock Exam 2020 (Paper 2)
Suggested answers

1ai) (1) Loss of a large volume of blood reduces blood pressure. Stretch receptors in arteries are stimulated less and less nerve impulse is transmitted to the hypothalamus resulting in an increase in ADH secretion.

An increase in the ADH secretion will increase the permeability of the distal convoluted tubule and the collecting duct to water (1) a larger proportion of water will be reabsorbed into the capillaries (1). This helps to conserve the blood volume and restore blood pressure / more water can be conserved for the body's use (1)

(2) Loss of a large volume of blood reduces blood pressure (1) reducing ultrafiltration rate (1).

(ii) The concentration of glucose is the same as that in the plasma entering it.(1)
There will not be any net movement of glucose into or out of the dialysing fluid during haemodialysis so the concentration of glucose in the plasma can be maintained. (1)

(iii) There is no urea in the dialysing fluid before haemodialysis(1)
so there is a net movement of urea from the plasma to the dialysing fluid by diffusion. (1)

(iv) This is to minimize the amount of urea formed through deamination. (1)

(Total: 10 marks)

1b)
(i) The FSH injections promote the development of a number of follicles. (1)
Therefore, more ova can be obtained for IVF to increase the chance of pregnancy. (1)
(ii) Progesterone (1)
It can maintain the thickness of the uterine lining.(1)

(iii) In a normal menstrual cycle, a higher level of LH will stimulate ovulation.(1)
If this LH surge is allowed to occur during the process of IVF, the ova cannot be obtained from the ovaries (1) and hence IVF cannot be carried out.
1m
(iv) r-FSH injections can help obtain more mature ova (1) because a higher level of oestrogen is found in the blood.
Oestrogen is secreted by follicles. Hence, a higher level of oestrogen implies that more follicles have developed.(1)

(v) No follicles are available for development in the ovaries of postmenopausal women.
Therefore, the level of oestrogen in the blood of postmenopausal women will decrease. (1)
Without the inhibition by oestrogen, the levels of FSH and LH will increase. (1)

2ai) When the atmospheric carbon dioxide concentration increases, the ocean pH decreases.(1)
When carbon dioxide dissolves in water, a slightly acidic solution is formed. (1)
With an increase in atmospheric carbon dioxide concentration, more carbon dioxide dissolves into the ocean water. This decreases the ocean pH.(1)

Carbon dioxide is soluble in water, NOT slightly soluble in water.

ii) (1) The results do not agree with the suggestion. (1)
The results show that sea snails living at the site with higher carbon dioxide concentration have thicker shells. (1)

(2) At the site with higher carbon dioxide concentration, the algae population size is larger.(1)
As they can carry out photosynthesis at a higher rate (1)
more food is available for the sea snails.(1)

The sea snails have more raw materials (1)
to build thicker shells. (1) (Total: 10 marks)

2 b) (i) Coastal reclamation (1)
It is because coastal reclamation destroys most habitats of horseshoe crabs. (1)
Exploitation of horseshoe crab (1)for medicine purpose (1)
Water pollution problem (1) causing harmful effect on horseshoe crabs (1).

(ii) <u>Reasons to support the Programme</u>:
- Enhance understanding of the biology of horseshoe crabs and so promote conservation of marine organisms and ecology (1)
- *Ex-situ* conservation through artificially breeding of horseshoe crabs and releasing them to the wild, to enhance declining populations (1)

OR
<u>Reasons to oppose the Programme</u>:
- Malpractice by students increases mortality of the rare species. (1)
- Release of horseshoe crabs may disturb pre-existing food web (feeding relationship) in the habitat. (1)

(iii) Horseshoe crabs are at the higher trophic level than their preys.(1)
First, their preys may have absorbed the toxins from the effluent, but the level of toxin is not high enough to kill them. (1)
The toxins cannot be broken down or excreted out of their body, and (1)
One horseshoe crab eats a number of preys. (1)
so accumulated up the food chain to a lethal level that kills the horseshoe crabs. (1) (Total: 10 marks)