UPPER SECONDARY IP BIOLOGY

Cells, Homeostasis, Nervous System, Human Eye

RGS S3 WA2 Revision

Answer Key

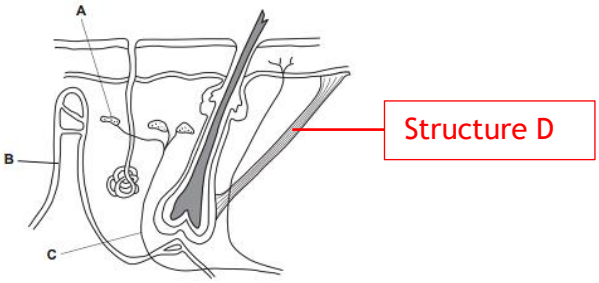
1	2	3	4	5	6	7	8	9	10
C	B	A	D	C	D	A	A	D	D

Question 11

(a) Structure A is a thermoreceptor [1] that detects changes in skin temperature, generating nerve impulses when skin temperature increases or decreases away from the norm. [1] Structure C is the sensory neurone [1] that transmits nerve impulses from the thermoreceptor towards the spinal cord. [1]

(b) Alcohol is a vasodilator that causes muscles in structure B, arterioles, to relax. [1] This causes the vessel to dilate and the lumen to widen, increasing the amount of blood flowing to the skin surface capillaries. [1] With more warm blood brought to the skin surface, more heat will be lost to the colder surrounding via conduction, convection, and radiation, resulting in a greater rate of heat loss. [1]

(c) (i)



(ii) When structure D contracts, the hair is pulled upright, trapping a thicker layer of air around the skin surface. [1] Since air is a poor conductor of heat, the rate of heat loss from the skin decreases. [1]

Question 12

(a) (i) K: Relay neurone

L: Brain

(ii) Adam's response was a voluntary action [1] as it was a conscious response that needed the brain to process the information. [1] Receptors in his ears detect the sound and generate nerve impulses that are transmitted through the sensory neurone and K, relay neurones, to L, the brain. [1] The brain processes the information and generates nerve impulses that are transmitted through M, relay neurones, and O, motor neurones, to stimulate target organs throughout the body. [1]

(b) The rooting reflex occurs faster than Adam's response. [1] Nerve impulses travel through the shortest pathway, the reflex arc, for a reflex action to occur. [1]

Question 13

(a) A: Cornea

B: Lens

C: Iris

D: Optic nerve

(b) Light rays from distant object are parallel, stimulating the ciliary muscles in the eyes to relax [1], causing the suspensory ligaments to be pulled taut. [1] This pulls the lens into a thinner and less convex shape, decreasing the focal length of incoming light rays. [1] The focal point lands sharply on the retina, allowing a clear and focussed image to be formed. [1]

(c) The eyeball looks to be compressed/squeezed, causing the retina to be nearer to the lens. [1] This would cause the focal point to land behind the retina, preventing the person from viewing objects clearly. [1]