

- (b) At approximately 10.30am, the Year 12 student went for a brisk walk. State the name of the adrenal hormone that is produced in the cortex and describe the mode of action of the hormone. (3 marks)

Description	Mark
Glucocorticoids/Cortisol	1
Stimulates glycogenolysis/stimulate breakdown of glycogen in liver and release of glucose into blood	1
Gluconeogenesis	1
Total	3

- (c) Describe how the graph illustrates the concept of negative feedback. (2 marks)

Description	Mark
Rise in blood glucose levels is a movement away from the norm	1
Release of insulin reduces/eliminates the original stimulus	1
Total	2

Diabetes is a chronic condition that results in sufferers having high blood glucose levels, frequent urination and constant feelings of thirst.

- (d) State the effect of high blood glucose levels on osmotic pressure of the blood. (1 mark)

Description	Mark
Increases	1
Total	1

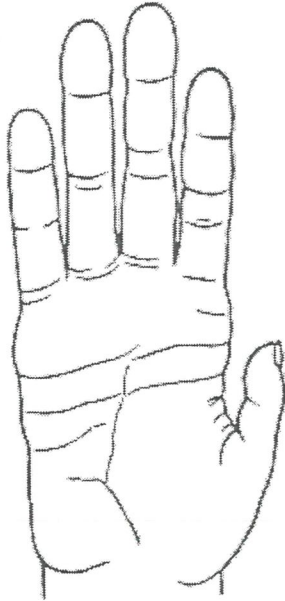
- (e) Explain why diabetes sufferers experience constant feelings of thirst. (3 marks)

Description	Mark
Osmoreceptors detect increased osmotic pressure	1
Stimulation of thirst centre makes the person feel thirsty	1
Conscious feeling of thirst stimulates person to drink	1
Total	3

Question 36

(14 marks)

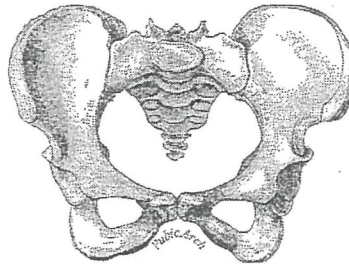
The following question refers to the diagram of the hand of a chimpanzee.



(a) State **one** feature of the hand of this primate that would differ from that of a *Homo sapiens*, and identify the evolutionary trend within the Great Ape family that is associated with this feature. (2 marks)

Description	Mark
Any one of the following for 2 marks:	
<ul style="list-style-type: none"> • Less mobility of digits • Increasing mobility/ability to move digits independently of one another 	1-2
<ul style="list-style-type: none"> • Less opposability of digits/Shorter thumb(or first digit) • Increased opposability/increased length in thumb(or first digit) 	1-2
<ul style="list-style-type: none"> • Longer and/or curved fingers / lower second to fourth digit ratio • No longer arboreal/no need to live/swing in tree canopies 	1-2
<ul style="list-style-type: none"> • Longer and/or skinnier palm • Increased opposability/move towards precision grip 	1-2
Total	2

The pelvis of a female *Homo sapiens* is shown in the diagram below.



- (b) Contrast **three** differences between the pelvis of a *Homo sapiens* and a *Homo erectus*. (3 marks)

Description	Mark
Pelvis is shorter in <i>sapiens</i> and longer in <i>erectus australopithec</i>	1
Pelvis is broader/more bowl shaped in <i>sapiens</i> and narrower in <i>erectus australo</i>	1
Femur attachment is more angled in <i>sapiens</i> and more vertical in <i>erectus australo</i> .	1
Total	3

tilted forward / backward.

- (c) Describe how the features identified in part (b) are associated with the increased ability to walk upright. (3 marks)

Description	Mark
<ul style="list-style-type: none"> Increased carrying angle/more efficient locomotion due to less sway/striding gait improved balance/increased stability when walking/weight distribution remains central Changes position of muscle attachment/allows attachment of larger muscles Supports internal organs/foetus when standing erect 	1-3
Total	3

- (d) Besides the ability to walk in a bipedal manner, state **one** other reason for the evolutionary trend seen in the pelvis. (1 mark)

Description	Mark
Offspring are born with larger brains/heads	1
Total	1

- (e) Fossils of *Homo neanderthalensis* have been found in Germany and throughout Europe. Beside the features of the skull, state **two** anatomical features of Neanderthals and discuss how selection pressures have acted on the species. (4 marks)

Description	Mark
Any two of the following:	
<ul style="list-style-type: none"> • Short stature • Thick necks • Short limbs • Powerful muscles • Barrel shaped chest <p style="margin-left: 100px;"><i>Body hair</i></p>	1-2
assisted in hunting big game	1
survival in the harsh conditions/ice ages of Europe	1
Total	4

Question 37

(11 marks)

- (a) State the relationship between cranial capacity and evolution of tools as seen in hominins. (1 mark)

Description	Mark
Tool development is associated with increased cranial capacity/intellect	1
Total	1

Four of the main hominin tool cultures are, Cro-Magnon, Acheulean, Oldowan, and Mousterian.

- (b) In the space below, create a phylogenetic tree that depicts the four hominin species associated with the tool cultures above, and suggest why the phylogenetic tree you created only depicts one possible evolutionary pathway. (3 marks)

Description	Mark
Must include: <ul style="list-style-type: none"> • Branches representative of evolutionary time/or time scale included • <i>H. habilis</i>, <i>H. erectus</i>, <i>H. Neanderthalensis</i> and <i>H. sapien</i> in order 	1-2
Suggested phylogenetic tree:	
One of the following for 1 mark: <ul style="list-style-type: none"> • Inferred relationships • Different interpretations of data 	1
Total	3

(c) Identify **two** trends seen in the tool cultures over time. (2 marks)

Description	Mark
Two of the following for 1 marks each:	
<ul style="list-style-type: none"> increasing refinement/more finely worked/more delicate objects made increased number of blows/flakes increase in the variety of materials used tools became more specific for their use increased time taken to make the tools 	1-2
Total	2

(d) State the hominin associated with the Acheulean tool culture and describe how the manufacturing of these tools may have influenced the social structure of the species. (3 marks)

Description	Mark
Must state:	
<ul style="list-style-type: none"> <i>Homo erectus</i> 	1
Any two of the following for 1 mark each:	
<ul style="list-style-type: none"> Mutual cooperation/cooperative group activities Men hunted and women gathered Spoken languages may have been present/improved communication Use of a home base 	1-2
Total	3

positive change

(e) Explain **one** ~~adaptive advantage~~ to the hominins way of life by using tools of the Cro-Magnon culture over the tools of the Oldowan culture. (2 marks)

Description	Mark
One of the following for 2 marks:	
<ul style="list-style-type: none"> Production of needles / evidence of stitching Improved protection through clothing 	1-2
<ul style="list-style-type: none"> Production of varied hunting tools Wider diet 	1-2
<ul style="list-style-type: none"> Production of tools for fishing Exploitation of coastal areas/waterways 	1-2
Total	2

Accepted - more specific tools for specific tasks (1 mark only)

Question 38

(18 marks)

Respiratory infections are a leading cause of seeking medical care in returning travellers. Due to enclosed spaces on aeroplanes, close proximity to contagious people is common.

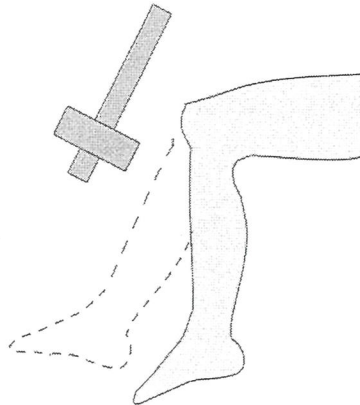
- (a) Explain how droplets can spread respiratory infections. (3 marks)

Description	Mark
Pathogen is housed within droplet	1
Droplets are emitted when breathing/talking/sneezing/coughing	1
Droplet comes in/breathed in/droplet is ingested	1
Total	3

- (b) Identify and describe **two** external defence mechanisms of the respiratory tract that would help prevent pathogens from entering the body. (4 marks)

Description	Mark
Any two of the following for 2 marks each:	
<ul style="list-style-type: none"> • Hairs within the nose cavity • Trap pathogens 	1-2
<ul style="list-style-type: none"> • Cilia/tiny hair-like projections from cells line airways • Movement of cilia moves pathogens towards throat 	1-2
<ul style="list-style-type: none"> • Lysozyme found in nose secretions • Kill bacteria 	1-2
<ul style="list-style-type: none"> • Mucous membranes • Secrete mucus that traps pathogens 	1-2
Total	4

Upon seeking medical assistance, the doctor undertook a reflex test as demonstrated in the diagram below.



(c) Explain the pathway of a spinal reflex. Ensure your answer refers to the neurons involved in the pathway.

(5 marks)

Description	Mark
Receptors detect the stimulus	1
Sensory neuron conducts nerve impulse/message from receptor to spinal cord	1
Information is processed in the CNS/One or more interneurons pass impulse/message to motor neurons	1
Motor neuron carries message/impulse to effector	1
Effector carries out appropriate response	1
Total	5

Whilst undertaking a medical assessment, the doctor noticed the patient had low concentrations of hormones and diagnosed hypopituitarism, or partial loss of the anterior pituitary.

- (d) State and describe the effect of **two** of the hormones that would be affected by hypopituitarism. *and describe their function in the body* (4 marks)

Description	Mark
Any two of the following for 2 marks each:	
<ul style="list-style-type: none"> • FSH/Follicle Stimulating Hormone • Stimulates development of the follicles 	1-2
<ul style="list-style-type: none"> • Luteinising hormone/LH • Brings about ovulation/forms corpus luteum/stimulates interstitial cells in the testes 	1-2
<ul style="list-style-type: none"> • Growth hormone • Stimulates body growth/increases rate at which amino acids are taken up by cells/maintains size of organs once mature 	1-2
<ul style="list-style-type: none"> • Thyroid-stimulation hormone • Stimulates production AND release of hormones from thyroid 	1-2
<ul style="list-style-type: none"> • Adrenocorticotrophic hormone/ACTH/Adrenocorticotropin • Controls production AND release of hormones from cortex of adrenal glands 	1-2
<ul style="list-style-type: none"> • Prolactin/PRL/lactogenic hormone • Initiate and maintain milk secretion 	1-2
Total	4

- (e) Describe why releasing and inhibiting factors from the hypothalamus are classified as hormones themselves. (2 marks)

Description	Mark
Secreted into extracellular fluid (surrounding hypothalamus)	1
Transported by the blood	1
Total	2