Pocket answer section for SQA Higher Human Biology 2000 – 2004

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Higher Human Biology 2000

Section A

1.	B	11.	D	21.	D
2.	A	12.	D	22.	B
3.	C	13.	B	23.	B
4.	D	14.	B	24.	A
5.	D	15.	C	25.	C
6.	B	16.	B	26.	A
7.	C	17.	D	27.	B
8.	A	18.	A	28.	D
9.	B	19.	C	29.	A
10.	A	20.	C	30.	A

Section B

- *(brackets) indicate useful but not essential*
- *solidus / indicates alternative*
- *underline indicates essential word phrase/idea required*
- *spelling should be at least phonetic to gain mark, except where specified otherwise eg 1(a)*

1. (*a*) **1** uracil
2 cytosine
3 thymine
(*correct spelling only*)

(*b*) **1** ribose (sugar)
2 phosphate/Pi (group)

(*c*) ribosome

(*d*) to carry code for manufacture/synthesis of protein/enzyme (1)
enzymes are essential/catalysts for cell metabolism (1)

2. (*a*) **F**(T)
(F)**F**
FT

(*b*) (i) pyruvic acid/pyruvate (*correct spelling only*)
(ii) oxygen
(iii) because less ATP/energy is produced or because waste products contain much energy or because breakdown of glucose is incomplete
(iv) glycogen (*correct spelling only*)

3. (*a*) (i) protein
(ii) nucleic acid changed/damaged/altered/absent **or** virus attenuated

(*b*) (i) viral DNA/RNA enters cell; viral DNA replicates; viral protein is manufactured
(ii) the cell (membrane) bursts/ruptures **or** lysis takes place

3. (*c*) because antibodies are specific **or** antibodies only recognise one type of antigen/virus **or** because viruses have different receptor/attachment sites

(*d*) (i) 350–650
(ii) 1975–76, 1977–78 and 1981–82 **or** 1976, 1978, 1982
(iii) because cilia cannot remove viruses/microbes from lungs (*not bacteria, dust, germs*)
(iv) the population is immune from previous exposure to this virus **or** there is a different weather pattern **or** a vaccination programme was introduced **or** there were different strains/types of viruses

4. (*a*) (i) B
(ii) change of order of bases **or** removal/deletion/addition/insertion/inversion/substitution of bases

(*b*) 50%

(*c*) pituitary (gland)

(*d*) (i) Down's syndrome
(ii) haemophilia

5. (*a*) (i) seminiferous tubules
(ii) activation/nutrition of sperm/provides energy/fluid medium/stimulates muscular contraction of female tract

(*b*) (i) *a cross (X) on sperm duct between testis and label-line to prostate gland*
(ii) because testosterone is carried in the blood

6. (*a*) *vertical line of any length at second week – between second and third vertical line*

(*b*) level → steep/sharp rise → steady rise
(*3 distinct stages described – 2 marks*)
(*2 distinct stages plus correct numerical reference – 2 marks*) (*1 stage plus 1 correct numerical reference – 1 mark*)

(*c*) (i) corpus luteum/ovary
(ii) placenta

(*d*) to stimulate/start/cause milk production/lactation (*not: to produce milk*)

Higher Human Biology 2000 (cont.)

7. (*a*) to remove excess tissue fluid/to carry lymph

(*b*) valves are present, which prevent the backflow of lymph (1)

the flow is maintained by muscular action/body movement (1)

blood pressure of tissue fluid is higher than that of lymph (1) (*any two*)

(*c*) because of an <u>increase</u> in numbers/activity of white blood cells/macrophages/ lymphocytes (1)
or because of accumulation of fluid **or** because of inflammation

(*d*) it carries out phagocytosis **or** it removes/digests foreign particles/engulfs bacteria (1)

(*e*) by diffusion **or** *description of diffusion*

(*f*) because fluid is lost from the blood **or** because of high surface area/cross section area of capillaries

or because of increased friction/resistance to flow

8. (*a*) (i) 1 : 3

(ii) directly proportional/as one rises, so does the other/as one falls, so does the other

(iii) 36·7 °C

(*accept as low as 36·68 °C*)

(iv) because changes to sweat production <u>follow</u> changes to skin temperature

(*b*) vasodilation **or** relaxation of hair muscles **or** decreased metabolic rate

(*c*) hypothalamus

9. (*a*) A Somatic B Central/CNS
C Brain D Sympathetic

(*b*) (i) working in opposition/having opposite effects

(ii) parasympathetic stimulates digestive system whereas sympathetic system inhibits digestive system (1) eg peristalsis/blood flow stimulated by parasympathetic (1)

10. (*a*) retina

(*b*) (i) converging/sensory

(ii) synapse/synaptic cleft

(iii) impulses from a number of cells come together/ accumulate/are added (1) this is more likely to reach a threshold/cause impulse to cross gap (1)

(*c*) visual/cerebral cortex/cerebrum

11. (*a*) ten/many students in each group

(*b*) because they were organised into <u>related</u> groups/categorised

(*c*) (i) *One mark for both scales and one mark for plotting points. Line of best fit, **or** straight lines joining points are acceptable. Deduct one mark for: plotting to zero **or** less than 50% of graph paper used **or** x/y scales transposed.*

(ii) because early words can be rehearsed **or** transferred to LTM

(iii) because words remembered late are not displaced from <u>STM</u>

(iv) serial position effect

(*d*) **Experiment 1** words are only shown for 30s/video.

Experiment 2 words are read without pause.

12. (*a*) respiratory diseases

(*b*) (i) infectious and parasitic diseases

(ii) lack of immunisation programme/poor water supply/poor hygiene/poor medical care/overcrowding in <u>developing countries</u>

or vice versa

(*c*) 10 million

(*d*) infections and parasitic diseases

(*e*) (i) cancers and/or circulatory diseases

(ii) The children have not lived long enough to allow these diseases to develop

or these are diseases of old age **or** children have not been exposed to smoke/bad diet.

(*f*) Most children are breast fed.

(*g*) Lack of access to safe drinking water.

(*h*) because the developing countries account for a much larger percentage/proportion of the world population

Section C

solidus / indicates alternatives
one mark per line unless stated otherwise

1. A Circulation of blood

(i) Vena cava brings blood to the heart from body to right atrium

Right atrium pumps blood into right ventricle through tricuspid valve*

Right ventricle pumps blood to lungs via pulmonary artery

(ii) Pulmonary vein brings blood to the heart from the lungs to left atrium

Left atrium pumps blood to left ventricle through bicuspid valve*

Left ventricle pumps blood to body via aorta

*Atrio-ventricular (AV) valve gains one mark if other two names not used

In addition, in either (i) or (ii)

valves prevent back flow

right ventricle has lower pressure/weaker than left ventricle

contraction of heart muscle is "systole"/relaxation is "diastole"

arteries lead to arterioles/capillaries **or** capillaries lead to veins/venules

right side of heart deals with deoxygenated blood and/**or** *vice versa*

B. Filtration and reabsorption in the kidney

(i) Glomerulus is a knot/bundle of capillaries

Blood (plasma) is filtered from the glomerulus to Bowman's capsule

Red blood cells *and/or* proteins are too large to pass through filter

Water/glucose/amino acids/vitamins/ salts/minerals/urea pass through filter (*any three*)

High pressure due to different cross section of arterioles

High surface area for easy/quick filtration **or** mention of high filtration volume (175 litres/24h)

(ii) Useful materials which have been filtered are reabsorbed

eg much water/salts and all glucose/amino acids, but not urea (*any three*)

(most) Reabsorption takes place in proximal convoluted tubule by active transport/ requires expenditure of energy

1. B (ii) continued

Water reabsorbed/salts removed in Loop of Henle

ADH controls reabsorption of water

ADH acts in collecting duct

ADH makes tubules more permeable

ADH produced when there is a shortage of water

2. A. Role of Lipids in the Body (maximum – 8 marks)

Energy store

Useful because insoluble **or** 2× more energy than carbohydrate weight for weight

Heat insulation

Protection from physical damage eg fat pads of feet/hands

Transport of certain vitamins (A,D,E,K)

Component of cell membranes

Diagram to show phospholipid bilayer **or** describe phospholipids in two layers

Some hormones are lipids/steroids eg testosterone/oestrogen/progesterone

Insulation of nerve fibres

By myelin sheath

Sebum/wax waterproofing of skin/keeps skin supple/protection from bacteria

B. Disruption of the Carbon Cycle (maximum – 8 marks)

Plants gain carbon by absorbing CO_2 from the atmosphere during photosynthesis

Animals gain carbon by eating plants or other animals

Carbon is returned to the atmosphere as CO_2 through respiration in animals and plants

CO_2 is produced as result of increased human activity/increased population/industrialisation eg burning fossil fuels (coal, oil and/or gas)/ biomass/trees (*any two*)

Removal of plants/forests/deforestation (to be replaced by buildings/agricultural land)

This is causing an increase in CO_2 concentrations in the atmosphere

This in turn is likely to be causing global warming/"greenhouse effect"

CO_2 acts as a blanket, retaining sun's heat

Excess methane from paddy fields/cattle has a similar effect

This will cause icecaps to melt/water to expand and sea level to rise

Results in major changes to weather patterns/drought/flooding/storms (*any two*)