

Mark Scheme (RESULTS)

January 2008

GCE O

GCE O Human Biology (7042/02)

Question Number	Answer	Mark
1 (a)	<p>contraction of intercostal muscles ; ribs move up and out ; diaphragm muscles contract ; diaphragm flattens ; increase in volume of thorax ; decrease in pressure in thorax ; outside / atmospheric pressure greater than internal ; air forced in ; reverse occurs for breathing out ; reference to lung elasticity ;</p>	max 8

Question Number	Answer	Mark
1 (b)	<p>oxygen required for aerobic respiration ; to release energy / ATP ; body's activities increase / named activity / physical exercise ; more energy / ATP required ; so greater respiration ; more oxygen required ; increased rate of breathing ; when body less active / asleep ; less energy required ; reference to feedback ; reference to carbon dioxide levels in blood ;</p>	max 8

Question Number	Answer	Mark
1 (c)	<p><u>oxygen</u></p> <p>inside red blood cells ; with haemoglobin ; combined to form oxyhaemoglobin ;</p> <p><u>carbon dioxide</u></p> <p>as hydrogencarbonate (ions) ; in solution ; in plasma ; combined with haemoglobin ;</p>	max 4

Question Number	Answer	Mark
2 (a)	<p><u>incisors</u> chisel shape ; used for biting / cutting ;</p> <p><u>canines</u> pointed / conical ; for tearing / cutting meat / eq ;</p> <p><u>molars</u> large surface area ; cusps / ridged ; for grinding / crushing ; better attachments through larger root ;</p>	max 6

Question Number	Answer	Mark
2 (b)(i)	<p>bacteria ; act on sugar / carbohydrates ; to produce acid ; which decays / erodes / dissolves enamel ; causing / leading to tooth decay ; removes plaque / bacteria ;</p>	max 4

Question Number	Answer	Mark
2 (b)(ii)	<p>(diet containing adequate) calcium ; and protein ; and phosphates ; components of teeth ; vitamin D required ; for uptake of calcium ; fluoride makes teeth more resistant to acid / reduces erosion ; vitamin C ; for gum development ;</p>	max 6

Question Number	Answer	Mark
2 (c)	<p>(bread mixed with) saliva ; rolled by tongue ; into a bolus ; (saliva contains) amylase / ptyalin ; breaks down starch ; into maltose ;</p>	max 4

Question Number	Answer	Mark
3(a)	<p>collection / many / large number of cells ; usually similar structure / can be different ; working together ; carry out a function ; two correct examples ; ; e.g. muscle e.g. epithelium</p>	max 5

Question Number	Answer	Mark
3 (b)	<p><u>nucleus</u> contains genetic material / chromosomes / genes / DNA ; controls activities of cell ; used as a template / ref to coding ; for manufacture of (m)RNA / DNA / proteins ; controls cell division ;</p> <p><u>mitochondria</u> site of aerobic respiration ; <u>release</u> energy ; in form of ATP ; used to drive other chemical reactions ;</p> <p><u>cytoplasm</u> contains cell organelles ; site of chemical reactions ; acts as storage area ; handles materials going in and out of cells ;</p>	max 9

Question Number	Answer	Mark
3 (c)	<p>protein ; catalyst ; speeds up chemical reactions ; remain unchanged at end of reaction ; many reactions occur in cell ; occur too slowly if no enzymes ; require too high a temperature to react without enzymes ; too little synthesis of materials / too little breakdown ; some intracellular and some extracellular ;</p>	max 6

Question Number	Answer	Mark
4 (a)	rapid ; involuntary / automatic ; response ; no involvement of brain ; protective function ;	max 4

Question Number	Answer	Mark
4 (b)	<p><u>diagram quality</u> suitable size ; dorsal and ventral root correctly shown; synapses in grey matter of spinal cord ;</p> <p><u>labels of structures in correct position</u> receptor organ ; sensory neurone ; motor neurone ; relay neurone ; white matter ; grey matter ; synapse ; effector ; dorsal root ganglion;</p>	<p>3</p> <p>max 7</p> <p>max 10</p>

Question Number	Answer	Mark
4 (c)	<p>Iris controls light entering eye ; adjusts size of pupil ; too much light iris closes ; prevents damage to retina ; light intensity too low ; pupil enlarged / radial muscles contract ; blinking when object approaches / object touches eye ; to prevent damage to eye ; blinking moves fluid over surface of eye ; clears away material that has entered eye ;</p>	max 6

Question Number	Answer	Mark
5 (a)	<p><u>contraceptive pill</u> contains hormones ; prevents release of ovum ; reliable ; easy to take / use ; could forget to take it ; problems with blood clots / other health factors ; thickens mucus ;</p> <p><u>condom</u> prevents sperm reaching ovum / eq ; reliable ; reduce risk of AIDS ; reduce risk of STDs / named disease ; needs to be put on before intercourse ; cost ;</p> <p><u>sterilisation</u> involves operation / specialist medical expertise ; cut sperm duct / oviduct ; prevents sperm reaching ovum ; effective ; can't be reversed ; carries risk of infection ;</p>	<p>max 3</p> <p>max 4</p> <p>max 3</p> <p>max 10</p>

Question Number	Answer	Mark
5 (b)	<p>meiosis results in haploid number / n / half the number ; when gametes fuse / fertilisation ; diploid / $2n$ restored ; mitosis results in diploid / $2n$ / same number ; on fusion chromosome number would be doubled ; results in death / deformities ;</p>	<p>max 4</p>

Question Number	Answer	Mark
5 (c)	<p>increase in size / change in body proportions ; development of secondary sexual characteristics ; deepening voice ; development of muscles ; pubic hair / hair under arms / on legs / chest / chest ; increase in size of reproductive organs ; gamete production ; increase awareness of opposite sex ; increased confidence / independence ; increased aggression / testosterone level increases ;</p>	<p>max 6</p>

Question Number	Answer	Mark
6 (a)	cars increase oxides of nitrogen in the air ; causes breathing problems / asthma ; carbon monoxide / CO given out by cars ; combines with haemoglobin ; reduced oxygen carriage ; lead in exhaust fumes ; toxic metal / enzyme inhibitor / causes brain damage / eq ; cigarette smoke contains harmful chemicals / named chemical ; destroys cilia of respiratory tract ; more mucus produced / can't be removed easily ; leads to bronchitis / emphysema ; lung cancer ; high blood pressure / heart attacks ;	max 10

Question Number	Answer	Mark
6 (b)	increase in temperature ; increases activity of white blood cells / reference to antigens ; phagocytes engulf organism ; digest / destroy ; lymphocytes make antibodies ; specific ; antitoxins neutralise toxins ; others cause pathogens to clump ; easier digestion by phagocytes ;	max 6

Question Number	Answer	Mark
6 (c)	diseases in (a) not caused by pathogens ; caused by pollutants which enter body / cause damage ; white blood cells can't respond to these ; no antibodies produced ; no memory cells produced ; body can't be immune / can't defend itself against new attack ;	max 4

Question Number	Answer	Mark
7 (a)	<p><u>diagram quality</u> size of at least five lines equivalent ;</p> <p><u>labels</u> cell wall ; cell membrane ; genetic material (reject if shown as a nucleus) ; flagellum / pilli ; ribosome ; cytoplasm ; capsule ;</p>	<p>1</p> <p>max 5</p> <p>max 6</p>

Question Number	Answer	Mark
7 (b)	<p>disease causing organism ;</p> <p>TB ; typhoid ; cholera ;</p>	<p>1</p> <p>max 2</p> <p>max 3</p>

Question Number	Answer	Mark
7 (c)	<p>decomposition / dead plants / animals / matter / sewage ; <u>yeast</u> in alcohol production ; brewing / wine making ; <u>yeast</u> in breadmaking ; makes dough rise ; <u>bacteria</u> in yoghurt production / cheese ; <u>fungi</u> antibiotic production ; e.g. penicillin / streptomycin ; eaten as mushrooms / truffles ; flavour cheese ; SCP / Quorn ; <u>bacteria</u> synthesis of vitamins ;</p>	<p>max 8</p>

Question Number	Answer	Mark
7 (d)	<p>fungus not made of cells ; fungus has a nucleus / many nuclei ; cell wall of chitin ; hyphae ; other organelles / two or more named organelles present ;</p>	<p>max 3</p>

Question Number	Answer	Mark
8 (a)	drain irrigation ditches (when growing season is over) ; no water for free swimming miracidium / fluke ; replace water canals with piped water ; dig wells to supply water ; snails can't enter ; treat infected people ; prevents them passing on disease ; use chemicals to kill snails ; use a biological control ; no intermediate host / larval stage can't develop ; keep ducks ; they eat snails ; provide boots for farmers / workers / don't swim in water ; fluke can't penetrate ; treating drinking water ;	max 10

Question Number	Answer	Mark
8 (b)(i)	<u>endemic</u> always present ; at low levels ; in a population ; <u>epidemic</u> large number of cases / sudden outbreak ; above normal level ; widespread / rapid spread ;	max 4

Question Number	Answer	Mark
8 (b)(ii)	tuberculosis spreads rapidly / becoming drug resistant ; tuberculosis spread direct from person to person ; through the air ; no vector / intermediate host ; no special conditions ; <i>Schistosomiasis</i> requires water ; and snails ; for part of life cycle ; transfer to humans only occurs when in contact with infected water ; these conditions only in certain areas ; so disease can't spread outside these areas ; so can't develop into a world-wide epidemic ;	max 6

