



RECOGNISING ACHIEVEMENT

JANUARY 2003

ADVANCED SUBSIDIARY GCE UNIT

MARK SCHEME

MAXIMUM MARK: 60

Syllabus / Component: 2802/01

Biology: Human Health and Disease

Paper Set Date: 15/01/03

ADVICE TO EXAMINERS ON THE ANNOTATION OF SCRIPTS

1. Please ensure that you use the **final** version of the Mark Scheme.
You are advised to destroy all draft versions.
2. Please mark all post-standardisation scripts in red ink. A tick (✓) should be used for each answer judged worthy of a mark. Ticks should be placed as close as possible to the point in the answer where the mark has been awarded. The number of ticks should be the same as the number of marks awarded. If two (or more) responses are required for one mark, use only one tick. Half marks ($\frac{1}{2}$) should never be used.
3. The following annotations may be used when marking. No comments should be written on scripts unless they relate directly to the mark scheme. Remember that scripts may be returned to Centres.

x = incorrect response (errors may also be underlined)
^ = omission mark
bod = benefit of the doubt (where professional judgement has been used)
ecf = error carried forward (in consequential marking)
con = contradiction (in cases where candidates contradict themselves in the same response)
sf = error in the number of significant figures
4. The marks awarded for each part question should be indicated in the margin provided on the right hand side of the page. The mark total for each question should be ringed at the end of the question, on the right hand side. These totals should be added up to give the final total on the front of the paper.
5. In cases where candidates are required to give a specific number of answers, (e.g. 'give three reasons'), mark the first answer(s) given up to the total number required. Strike through the remainder. In specific cases where this rule cannot be applied, the exact procedure to be used is given in the mark scheme.
6. Correct answers to calculations should gain full credit even if no working is shown, unless otherwise indicated in the mark scheme. (An instruction on the paper to 'Show your working' is to help candidates, who may then gain partial credit even if their final answer is not correct.)
7. Strike through all blank spaces and/or pages in order to give a clear indication that the whole of the script has been considered.
8. An element of professional judgement is required in the marking of any written paper, and candidates may not use the exact words that appear in the mark scheme. If the science is correct and answers the question, then the mark(s) should normally be credited. If you are in doubt about the validity of any answer, contact your Team Leader/Principal Examiner for guidance.

Abbreviations, annotations and conventions used in the Mark Scheme	/ = alternative and acceptable answers for the same marking point ; = separates marking points NOT = answers which are not worthy of credit () = words which are not essential to gain credit <u> </u> = (underlining) key words which must be used to gain credit ecf = error carried forward AW = alternative wording A = accept R = reject ora = or reverse argument
---	---

Question	Expected Answers	Marks
1 (a) (i)	aerobic;	1
(ii)	lactate / lactic acid;	1
(b) (i)	thymus;	1
(ii)	allergen / allergenic; R allergy	1
		[Total: 4]

Question	Expected Answers	Marks
2 (a)	<p>P – alveolus; Q – (branch of pulmonary) artery; A arteriole R – (branch of pulmonary) vein; A venule S – bronchiole;</p>	4
(b)	<p><i>assume answer is about B unless stated otherwise</i></p> <p><i>alveoli</i></p> <p>fewer / ruptured / collapsed, alveoli; larger air spaces; smaller surface area;</p> <p><i>bronchiole</i></p> <p>no cilia; flattened cells / several layers of cells / scar tissue; wall not folded; no, muscle / connective tissue / elastin;</p>	max 2
(c)	<p>loss of, elasticity / elastic tissue; A damaged alveoli cannot recoil / no elastic recoil; (elastic tissue / elastin) destroyed by action of, phagocytes / neutrophils / macrophages; AVP; e.g. elastase</p>	max 2
(d)	<p><i>idea that</i> large, percentage / proportion / number, of people with emphysema who smoke; ora increase in number of people with emphysema since (cigarette) smoking became common;</p>	1

[Total: 9]

Question	Expected Answers	Marks
3 (a)	proteins / polypeptides; essential; A; xerophthalmia / night blindness / blindness / scarring of cornea;	4
(b)	<u>malnutrition</u> / <u>malnourished</u> ; lack of vitamin D; lack of calcium; AVP; e.g. lack of protein (for collagen in bone) demineralisation, qualified hormonal imbalance, qualified	max 2
(c)	1 more energy / more carbohydrates / more fats; 2 e.g. of appropriate food(s); 3 <i>idea that</i> milk may be child's only source of, energy / nutrients; 4 mother's, metabolism / metabolic rate, increases to produce milk; 5 more, protein / macronutrients / micronutrients / vitamins / minerals / named vitamin / named mineral / essential amino acids; 6 e.g. of appropriate food(s); 7 named use of nutrient in baby; 8 <i>idea that</i> mother's body stores are not enough to supply nutrients; 9 AVP; e.g. less / no, alcohol	max 3

[Total: 9]

Question	Expected Answers	Marks
4 (a) (i)	<i>treat bacteria as neutral</i> <i>Vibrio (cholerae);</i> accept <i>V. cholerae</i>	1
(ii)	(bacteria) leave person in faeces; sewage and water supply not separated / human faeces (sewage) contaminates water supply; person drinks water / eats food / swims in contaminated water / AW; faecal-oral route = 2 marks	3
(iii)	(a disease that is) always in a, population / area / country; R worldwide	1
(iv)	breast milk is sterile / idea; infants do not drink (contaminated) water / drink milk; <u>passive</u> immunity; milk may contain antibodies (to cholera); antibodies provide protection for infant;	max 2
(b)	<i>sanitation should be qualified / explained</i> piped water; ensure that water supply is separate from sewage; hygienic, removal / disposal, of faeces; A 'human waste' / sewage treatment latrines; encourage breast feeding; treat people with cholera / provide ORT / provide antibiotics / provide trained medical personnel / medical facilities / access to medical facilities; boiled drinking water / sterilised water / chlorinated water; make sure people, eat cooked food / avoid raw food; AVP;; e.g. ref to education, vaccination, contact tracing, cordon sanitaire, ref to flies	max 3
(c)	malaria is transmitted by, mosquito / <i>Anopheles</i> / vector; <i>idea that</i> distribution is determined by mosquito which lives in, tropics / subtropics / described; ora malaria not dependent on poor, hygiene / sanitation; cholera transmitted via water or food; sickle trait / genetic factors, influence distribution of malaria; ref to natural disasters / man made disasters; AVP;	3

[Total: 13]

Question	Expected Answers	Marks
5 (a) (i)	58 (%); <i>answer should be in the table</i>	1
(ii)	the total population (of men / of women, in 1997); the total number of deaths (in 1997); mortality rate (deaths per 100 000); CHD / stroke / lung cancer, deaths as a percentage of the total;	max 1
(iii)	yes people under 75; higher, proportion / percentage, of deaths among men; percentage data quote; e.g. 50:25 / 34:17 / ref to twice as great NOT 25% of women die etc.. <i>no</i> table does not give life expectancy of men and women; no figures for separate ages beyond 75; average life expectancy is greater than 75 / men and women should live beyond 75; AVP; no specific information on age of deaths	max 3

(b) *carbon monoxide*

- 1 combines with haemoglobin;
- 2 carboxyhaemoglobin / haemoglobin has high affinity for CO / irreversible;
- 3 decrease in oxygen transported / taken up, by the blood / haemoglobin;
- 4 damages lining of arteries;

- 5 heart tissue starved of oxygen; (*maybe awarded for atherosclerosis*)

nicotine

- 6 increases, heart rate / pulse;
- 7 increases, blood pressure / hypertension;
- 8 high blood pressure is a risk factor in, CHD / stroke;
- 9 increases force of contraction of heart;
- 10 increases stickiness of platelets;
- 11 increases chances of, thrombus / clotting;
- 12 constricts / narrows, arteries / arterioles;
- 13 increases (blood) cholesterol;
- 14 increase in LDLs;

- 15 atherosclerosis;
- 16 detail of process in walls of arteries / ref to plaque formation / fatty deposits;
- 17 reduced blood flow;
- 18 coronary arteries;
- 19 heart attack / angina / heart failure;
- 20 arteries to the brain;
- 21 haemorrhaging in brain / described;

- 22 AVP; e.g. ref adrenaline, reduced blood flow to extremities, gangrene
- 23 AVP; **max 7**

QWC – clear, well organised using specialist terms; **1**

*award Q mark if at least 1 constituent is named and used correctly
and at least three other technical terms given*

[Total: 13]

Question	Expected Answers	Marks
6 (a)	overall decline to 1992; decrease to 1987; (slight) rise in late 80s / variable in the late 80s or early 90s; (larger) rise in mid 90s; (steep) decrease in late 90s; increase in 2000 / unclear trend from late 90s; ref to figures for number of cases to illustrate a trend;	max 3
(b)	identifies / tracks, epidemics / pandemics / outbreaks; identifies, places / countries / people, at risk; alerts, health authorities / governments; particularly those bordering areas where there are epidemics / idea; organises / coordinates, control measures; provides vaccines / coordinates vaccination programmes; checks effectiveness of control measures; targets resources; predicts outbreaks; provides data bank to identify long-term trends; AVP; e.g. health warnings to travellers	max 3
(c)	provides <u>active</u> immunity / described; ref memory cells / immunological memory; most children vaccinated when young; herd immunity / idea; <i>idea that</i> no / little, reservoir of infection in unvaccinated people; difficult for bacteria to spread as most people are immune;	max 3
(d)	ineffective against viruses / other classes of diseases; (overuse may lead to) <u>resistance</u> ; R immune detail; e.g. mutation / selection / enzymes breakdown antibiotic example; MRSA / TB some bacteria are not susceptible to certain antibiotics; some antibiotics should be kept in reserve as a 'last resort'; ref to use in, animals / agriculture; ref cost to develop antibiotics; allergies; AVP; e.g. takes time to develop new antibiotics, refs to unnecessary uses	
	R antibiotics cause mutations A antigen as alternative for pathogen	max 3
		[Total: 12]