

Subject: Human Health and Disease Code: 2802

Session: June Year: 2002

Mark Scheme

MAXIMUM MARK	60
---------------------	-----------

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 (½) 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 R = reject () = words which are not essential to gain credit _____ = (underlining) key words which must be used to gain credit ecf = error carried forward A = accept AW = alternative wording ora = or reverse argument
---	---

Question	Expected Answers	Marks
1 (a)	sufficient / enough, energy to meet needs / AW; carbohydrates; fat / lipid / oil; protein; <u>essential</u> fatty acids / linoleic / linolenic; <u>essential</u> amino acids / named EAA; vitamins / named vitamin; minerals / salts / named mineral; fibre / roughage; water;	max 5
(b) (i)	23;	1
(ii)	acceptable / ecf from part (i) if category chosen from table matches calculated BMI;	1
(c)	arthritis / joint problems; CHD / (coronary) heart disease / heart attack / heart failure / CVD; stroke; angina; thrombosis / blood clotting; atherosclerosis; (named) cancer; high blood pressure / hypertension; breathlessness / shortness of breath / AW; diabetes; depression; varicose veins; gall stones; hernia; kidney failure; AVP; e.g. second named cancer	max 3
	cancers – breast, womb / cervical, ovary, gall bladder, colon / rectum / bowel, prostate, testicular	

Question	Expected Answers	Marks
2 (a)	<i>exercise that uses / exercise that improves</i> cardiovascular system / heart; lungs / appropriate ref to breathing; ref oxygen; for aerobic respiration (in muscles); A mitochondria, equation for aerobic respiration, Krebs and oxidative phosphorylation	max 2
(b)	so could tell when father had recovered / end of recovery period / compare pulse during and after exercise / find when pulse returns to normal / so have same starting pulse / idea of reliability;	1
(c)	supply of / demand for, oxygen / glucose, in muscles; muscles / organs, still respiring above resting level; oxygenate, myoglobin / haemoglobin; NOT oxidise oxygen concentration in blood is low; ref to anaerobic respiration; removal of / oxidation of, lactate; removal of carbon dioxide; ref metabolism in liver; ref oxygen deficit; ref oxygen debt; high temperature, high metabolic rate / respiration rate; AVP; e.g. resynthesis of CP / adrenaline still present / ref to control of the heart / loss of heat from the body	max 3
(d)	ref to a stated level of difficulty; A exercise at 70% of VO_2 max exercise / train, on a regular basis; e.g. a certain number of times a week ref fixed training time; record <u>resting</u> pulse at intervals / record recovery time after exercise; plot on graph; expect a decrease in time for recovery / expect an increase in recovery rate / expect a decrease in resting pulse rate; step test / AW; e.g. ref to 'finding VO_2 max' / vital capacity / lactate (concentration) in blood but NOT tidal volume or breathing rate any detail;	max 3
[Total		9]

Question	Expected Answers	Marks
3 (a)	<i>if more than two given, look for two correct answers</i> pollen; ref to dust mite; spores; fur / skin / hair; feathers; dust; insect / wasp / bee, sting; penicillin; a named food; e.g. nuts AVP;;	max 2
(b) (i)	V T (lymphocyte / cell); A helper cell, but R T killer cell W B (lymphocyte / cell); A plasma (cell) / effector (cell) Z mast (cell);	3
(ii)	X antibody / IgE / immunoglobulin (E);	1
(c)	cell Z has a, receptor / binding site / glycoprotein / AW; ref to specificity; <i>in context of receptor for antibody</i> complementary shape to, X / antibody / IgE; A suitable alternatives for complementary but R 'same shape as....' constant region / heavy chains / heavy polypeptides / non-variable region (of antibody);	max 2
(d)	inflammation / (tissue) swelling; more mucus produced; leaky capillaries; plasma / (tissue) fluid (leaves the blood); phagocytes / named phagocytic cells (leave the blood); (smooth) muscle contracts; R bronchioles contract decreasing diameter / AW; e.g. 'tightens airways' obstructed / less air (or oxygen) to alveoli / restricts air flow;	max 3
[Total		11]

Question	Expected Answers	Marks
4 (a)	total / all, genetic material / DNA (in a cell / organism); A 'all the genes'	1
(b)	1 find link between gene(s) and disease(s); 2 named disease; 3 named disease; 4 (genes) influence development; 5 reliable, gene / DNA, tests; 6 tests for / diagnosis of, specific / named, disease(s); 7 cheek scraping / blood sample; 8 antenatal tests / screening unborn children; 9 ref therapeutic abortions; (e.g. thalassaemia) 10 post-natal screening for diseases; <i>as a result of screening....</i> 11 targeting preventative measures; 12 targeting treatment; 13 DNA produces protein; 14 ref to drugs / medication; 15 direct drugs to individual; 16 gene therapy / described; 17 detail / any e.g.; CF / SCID 18 results from gene tests not always clear cut; 19 effect on psychological health knowing about harmful allele / idea; 20 discrimination by employers; 21 discrimination by insurance companies; 22 copyright / ownership, problems (who owns genetic information); 23 use of statements; 24 reluctance of people to be tested; 25 confidentiality / privacy / AW; ora 26 AVP; e.g. 'over the counter' tests	max 7
	R refs to cloning and 'designer babies'	
	QWC – legible text with accurate spelling, punctuation and grammar;	1
[Total		9]

Question	Expected Answers	Marks
5 (a)	<i>Vibrio (cholerae)</i> ; A <i>V. cholerae</i>	1
(b)	<i>the following points may be awarded in parts (i) and (ii) to max 4 candidates may make converse of these points</i>	
1	cholera transmitted in, water / food; A refs to contamination by cholera / bacteria	
2	<u>faeces</u> contain bacteria;	
3	poor sanitation / untreated sewage; e.g. latrines near water courses	
4	water not piped;	
5	water not, chlorinated / treated;	
6	transmitted by flies;	
7	people can be carriers;	
8	transmitted by poor hygiene / people who do not wash their hands after using toilet;	
9	(human sewage) used in irrigation / watering crops / manuring crops;	
10	boiling / (thorough) cooking, kills bacteria;	
11	AVP; e.g. refs to raw fish, shellfish, salads	max 4
(c)	disease suddenly spreads / many people have the disease / increase in number of cases;	1
(d)	<i>V. cholerae</i> in intestine; out of reach of immune system; antigenic concealment; antibodies broken down in intestine; antibodies are proteins; ref to pH and effect on structure or shape; e.g. in the stomach denaturation; vaccine stimulates antibodies in, blood / lymph; not in gut; oral vaccine needed; mutation; different strain idea; AVP; e.g. not required in developed countries developing countries cannot afford to develop vaccines no / limited, demand cholera can be treated with ORT can be treated with antibiotics	max 3
[Total		9]

Question	Expected Answers	Marks
6 (a) (i)	carcinogens / carcinogenic;	1
(ii)	mutation / change in DNA; ref to oncogenes; R if cells are called oncogenes cells divide / mitosis; A cells replicate / multiply / cells reproduce but R cells grow uncontrolled; R rapid cells change in their response to, growth factors / other cells / signals; no programmed cell death / no apoptosis; cells do not, differentiate / become specialised; AVP; e.g. further detail of mitosis or its control	max 3
(b)	cough, qualified; e.g. persistent / bad / chesty etc <u>blood</u> in, sputum / phlegm; A coughing up blood pain in chest / tight chest / AW; loss of voice; breathlessness / shortness of breath / difficulty in breathing / AW; R wheezing weight loss; cannot sustain exercise / lethargy / weakness;	max 2
(c)	<i>max 3 if answer does not include explanation – marking points 3, 5, 6, 8 and 9 are explanations</i> 1 increase in death rate up to 1970 in men 60-74; 2 from ~200 to ~450 per 100 000; 3 even though percentage of smokers in population falls; 4 ref to figs to illustrate fall; 5 lung cancer takes 20-40 years to develop / >20 years to develop / degenerative disease; 6 deaths are of people who had been smoking for many years; 7 fall after 1970, ~450 to ~250 (per 100 000); 8 reflects fall in percentage of population who smoke; 9 health warnings / RCP reports / low tar cigarettes / ref to treatment / AW; 10 decrease in death rate for 35-59 year olds; 11 ref to figs to illustrate fall from ~ 50 to ~ 25 (per 100 000)	max 4
[Total		10]