

Subject: Human Health and Disease Code: 2802

Session: January Year: 2001

Mark Scheme

MAXIMUM MARK	90
-------------------------	-----------

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.

Mark Scheme Page 1 of 11	Unit Code 2802	Session January	Year 2001	Version Final
------------------------------------	---------------------------------	---------------------------	---------------------	-------------------------

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 ora = or reverse argument
---	---

Question Expected Answers Marks

1 (a)

disease	categories of disease		
	infectious	deficiency	degenerative
cholera	✓		
night blindness		✓	(✓)
lung cancer			✓
stroke			✓

one mark per row

4 max

(b)(i) cystic fibrosis / haemophilia / sickle cell anaemia / Huntington's / PKU / **AW**;

1

(ii) *check answer against example given in (i), but mark independently from (i) if example given in (i) is incorrect*

caused by, genes / DNA;

(gene) mutation;

passed from parents to child / **AW**; **NOT** inherited

via gametes;

parents may be carriers;

or have the disease;

caused by, (2) recessive alleles / dominant allele; **(A)** gene for allele

3 max

(c) person's, own actions / choices / lifestyle, put them at risk of diseases;

1

(d) (very) large number of people smoke / smoking occurs worldwide / **AW**;

can cause, disease / smoking-related diseases / named disease;

rapid increase; (e.g. in developing world)

1 max

[Total : 10]

Mark Scheme Page 2 of 11	Unit Code 2802	Session January	Year 2001	Version Final
------------------------------------	---------------------------------	---------------------------	---------------------	-------------------------

Question	Expected Answers	Marks
2 (a)	bone marrow; NOT if part of list	1
(b)	<p><i>antigen</i> foreign, body / organism / substance; (A) pathogen / named type of pathogen / cell; outer part of named structure; lipid / polysaccharide; non-self;</p> <p><i>antibody</i> protein; (immuno)globulin; ref to specificity; ref to humoral / plasma / blood / tissue fluid / lymph; mode of action of antibody;</p>	<p>max 3</p> <p>max 3</p>
	ref to immune response; (for antigen or antibody - as part of max 3)	4 max
(c)(i)	<p><i>plasma cell has</i> Golgi;</p> <p><i>plasma cell has more</i> (rough) endoplasmic reticulum / (R)ER; ribosomes; mitochondria; Golgi / secretory, vesicles;</p> <p>larger / more cytoplasm / nucleus is smaller (relatively) / AW;</p>	3 max
(ii)	<p><i>check answer against (i)</i> antibody is protein; made by, ribosomes / RER; many ribosomes / much ER, fast / large, production of antibody; energy / ATP, required; mitochondria provide energy; Golgi, for packaging / adding carbohydrate / making glycoprotein / AW; vesicles / Golgi / ER, for transport; more space for named organelles (involved in protein synthesis);</p>	3 max

Mark Scheme Page 3 of 11	Unit Code 2802	Session January	Year 2001	Version Final
------------------------------------	---------------------------------	---------------------------	---------------------	-------------------------

- (d) memory cells;
produced during, first response / primary response / first time antigen entered;
divide / mitosis (in secondary response);
develop into plasma cells;
more plasma cells (than in first response);
more cells that will respond to the antigen, so greater chance to find it;
ref to clonal selection;
ref to time qualified; (e.g. less time to produce same number of plasma cells)
AVP; (e.g. B cell clones, further detail of points above)

4 max
[Total : 15]

Mark Scheme Page 4 of 11	Unit Code 2802	Session January	Year 2001	Version Final
------------------------------------	---------------------------------	---------------------------	---------------------	-------------------------

Question	Expected Answers	Marks
3 (a)	cannot be, made / synthesised; ® metabolised from, other / non-essential, amino acids; by transamination; any other compound; no enzymes (to make them); proteins cannot be made without them; ref deficiency disease;	2 max
(b)	poor growth / AW ; underweight; poor development; poor, wound healing / repair; poor immune system / susceptibility to disease; few antibodies / lymphocytes; muscle wasting; oedema / bloated abdomen; few plasma proteins; fatty liver; poor digestion, reason; marasmus / kwashiorkor / protein-energy malnutrition; AVP;; (e.g. apathy / lethargic, thin hair, moon face etc)	3 max

Mark Scheme Page 5 of 11	Unit Code 2802	Session January	Year 2001	Version Final
------------------------------------	---------------------------------	---------------------------	---------------------	-------------------------

- (c) *lactating woman requires higher intake because she needs*
- 1 energy required to produce milk;
 - 2 energy required for, body maintenance / physical activity;
 - 3 nutrients to, replace those lost in milk / prevent deficiency;
 - 4 milk provides most or all of baby's, nutrition / energy / nutrients;

baby needs

- 5 energy for a named process;
- 6 protein required for growth;
- 7 immune system;
- 8 vitamin A for retina;
- 9 detail of function in retina / ref to deficiency;
- 10 for epithelia / protection against disease;
- 11 vitamin D for absorption of calcium;
- 12 deposition of calcium in bone / calcification;
- 13 baby's skin unlikely to make enough vitamin D;
- 14 as not exposed to enough sunlight;
- 15 calcium required for skeleton / bone growth;
- 16 fat, for making fat stores / insulation / provides energy;
- 17,18 ref comparative figures to support statements;;
- 19,20 AVP;; (e.g. repair of uterus, further detail of points above)

7 max

Q – legible text with accurate spelling, punctuation and grammar

1

8 max

(d)

<i>vitamins</i>	<i>minerals</i>	<i>minerals</i>	<i>others</i>
C;	sodium;	magnesium;	water;
B;	phosphorus;	chloride	fibre / cellulose / roughage;
E;	fluoride;	potassium;	fats / essential fatty acids /
K;	zinc;	iron;	lipids / triglycerides;
folic acid;	copper;	molybdenum;	
	manganese;	iodine;	AVP;;;
	cobalt;		

NOT glucose / vitamins A and D / calcium / protein / starch / glycogen / maltose / lactose / sucrose / disaccharides / polysaccharides **3 max**

[Total : 16]

Mark Scheme Page 6 of 11	Unit Code 2802	Session January	Year 2001	Version Final
------------------------------------	---------------------------------	---------------------------	---------------------	-------------------------

Question	Expected Answers	Marks
4 (a)	<p><i>systolic:</i> maximum / highest, blood pressure; when blood, is pumped / surges, out from, heart / left ventricle;</p> <p><i>diastolic:</i> minimum / lowest, blood pressure; heart / left ventricle, is filling / relaxed / not contracting / between 'pulses'; ref resistance to blood flow;</p> <p>ref to '120 over 80' identified as systolic and diastolic respectively; diastolic usually constant, systolic varies;</p>	3 max
(b)(i)	<p><i>max 1 if no units given at all but numbers are correct</i></p> <p><i>systolic:</i> 16 kPa; (A) 16/17 kPa, but @ 17 kPa on its own <i>diastolic:</i> 10 kPa;</p>	2
(ii)	<p><i>NOT any descriptions of Fig. 4.1</i></p> <p><i>increase</i> stroke volume / (cardiac) output from heart / blood pumped out from heart; power of contraction; (A) beats harder</p> <p><i>to</i> provide more, oxygen / oxygenated blood; provide more glucose; remove lactate; remove carbon dioxide; remove heat;</p> <p><i>for</i> muscles; increase in respiration / demand for energy; contraction;</p> <p><i>accept</i> correct ref to function of adrenaline; vasoconstriction / described;</p>	4 max

Mark Scheme Page 7 of 11	Unit Code 2802	Session January	Year 2001	Version Final
------------------------------------	---------------------------------	---------------------------	---------------------	-------------------------

- (iii) time for heart to adjust;
demand for, oxygen / glucose, in muscles;
muscles / organs, still respiring above resting level;
oxygenate, myoglobin / haemoglobin; NOT oxidise
oxygen concentration in blood is low;
removal of / oxidation of, lactate;
ref metabolism in liver;
repaying oxygen debt;
AVP; (e.g. resynthesis of CP / adrenaline still present / ref to control of the heart)
- 3 max**

(c) *increase*

heart, muscle / size;
left ventricle;
stroke volume / cardiac output;
mitochondria (in heart muscle);
blood vessels / blood supply / capillaries (in heart muscle);
efficient use of oxygen;

decrease

blood pressure / systolic pressure / diastolic pressure / risk of hypertension;
resting heart rate;
recovery time;
risk of atherosclerosis in coronary artery; (**A**) protects against CHD;

3 max

[Total : 15]

Mark Scheme Page 8 of 11	Unit Code 2802	Session January	Year 2001	Version Final
------------------------------------	---------------------------------	---------------------------	---------------------	-------------------------

Question	Expected Answers	Marks
5 (a)	<p><i>accept first answer that stands in each section</i></p> <p><i>active</i> catch measles / become infected / gain antigen; vaccination; NOT injection(s) immune response; memory cells / immunological memory;</p> <p><i>passive</i> antibodies from mother; across placenta / in milk / ref to breast feeding; antibodies injected; temporary;</p>	<p>max 3</p> <p>max 3</p> <p>4 max</p>
(b)	<p>very infectious / spreads easily; ref overcrowded conditions; affects infants, before they can be vaccinated; infants often need several boosters; difficult to reach all infants in time; difficult to achieve herd immunity; AVP;; (e.g. risks associated with vaccine, refusals, ref to cost qualified, shifting populations, migration, only 95% effective) NOT ref to mutation</p>	<p>2 max</p>

Mark Scheme Page 9 of 11	Unit Code 2802	Session January	Year 2001	Version Final
------------------------------------	---------------------------------	---------------------------	---------------------	-------------------------

- (c)
- 1 smallpox virus, was stable / did not mutate;
 - 2 same vaccine was used for whole programme / did not need to be changed;
 - 3 vaccine was live;
 - 4 one 'shot' was enough to give life-long immunity / no boosters required;
 - 5 heat stable / freeze dried, vaccine;
 - 6 suitable for, hot countries / isolated areas / rural areas;
 - 7 bifurcated / steel, needle;
 - 8 herd / mass, vaccination / immunity;
 - 9 prevented spread through population;
 - 10 ring vaccination / ref to contact tracing;
 - 11 prevented spread from isolated infected people;
 - 12 few / no, symptomless carriers;
 - 13 no animal reservoir / only in humans;
 - 14 many people became vaccinators / AW;
 - 15 ref to surveillance / infected people easy to identify;
 - 16 AVP;
 - 17 AVP;

6 max

Q – clear, well organised using specialist terms;

1

7 max

[Total : 13]

Mark Scheme Page 10 of 11	Unit Code 2802	Session January	Year 2001	Version Final
-------------------------------------	---------------------------------	---------------------------	---------------------	-------------------------

Question	Expected Answers	Marks
6 (a)(i)	atheroma / plaque; NOT atherosclerosis build up of fatty deposit / cholesterol; lining of, (coronary) artery / tunica intima / AW ; reduces / obstructs, flow of blood; (A) blocks lumen, NOT 'clogs up' ref to thrombus / blood clot;	3 max
(ii)	no / reduced, oxygen / glucose, supply; no / reduced, removal of, lactate / carbon dioxide; anaerobic respiration; not enough energy / build up of lactate; cardiac muscle, cells stop contracting / contract less powerfully; (localised) death, of cells / muscle; myocardial infarction / heart attack; angina / cramp in muscle;	3 max
(b)	<i>promote / provide</i> healthy diet / named aspect of diet (aerobic) exercise; recreational facilities; screening programmes for, blood cholesterol / blood pressure; advice on giving up smoking; health promotion in schools; discourage obesity; reduce alcohol intake; check ups for high risk people; tax tobacco; AVP;;; (accept further specific points about diet)	3 max

[Total : 9]

Mark Scheme Page 11 of 11	Unit Code 2802	Session January	Year 2001	Version Final
-------------------------------------	---------------------------------	---------------------------	---------------------	-------------------------

Question	Expected Answers	Marks
7 (a)	<i>Mycobacterium</i> / mycobacteria; (A) micobacteria NOT micro / mycro / myo etc....	1
(ii)	(infected people) breathe out / sneeze / cough / spit; airborne / droplets / mucus / saliva; (uninfected people) breathe in / enters nose or mouth; (transmitted in) sputum / phlegm;	3 max
(b)	decrease over, whole time period / stated time period; increase over stated time period; only slight decrease since approx 1970 / fairly constant at end of century / slight rise at end of century; rates of decrease vary / AW ; ref to numbers of cases to show a change;;	4 max
(c)	improved housing; better ventilation in, housing / workplaces; less overcrowding / ref to fewer people sleeping in same room; less homelessness; improved standard of living / less poverty; education, qualified; better diet; better, medical services / hospitals; (e.g. supply of vaccines / antibodies / drugs) AVP;; NOT vaccination / drugs unqualified or in medical context alone	4 max

[Total : 12]