



GCE MARKING SCHEME

SUMMER 2012

**APPLIED SCIENCE
AS/Advanced**

INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2012 examination in GCE APPLIED SCIENCE. They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

APPLIED SCIENCE - ASC1

Question		Answer	Marks	AO1	AO2	AO3
1.		Any two from: emergency operations organ transplant leukaemia/cancer patients cardiac operations premature babies anaemia rheumatoid arthritis bone marrow failure Christmas disease	2	2		
2.	(a)	Produce antibodies/antitoxins attack microbes/pathogens	2	2		
	(b)	Any two from: rbc no nucleus but wbc nucleus present reference to shape rbc biconcave disk (not doughnut shaped) rbc haemoglobin, wbc no haemoglobin wbc larger than rbc Must compare rbc to wbc	2	2		
3	(a)	ABO and rhesus. (Both needed)	1	1		
	(b)	$1579/53288 \times 100 = 2.96\%$ 1 mark substitution 1 mark answer (if no workings but correct answer = 2 marks)	2		2	
	(c)	Comparatively rare/rarely used/storage for up to 1 year	1	1		
	(d)	AB+ only	1	1		

Question		Answer	Marks	AO1	AO2	AO3
4	(a)	50 kg/7 stone 12 pounds	1	1		
	(b)	Any two from: already given blood in the last 12 weeks have chesty cough / sore throat / cold sore currently taking antibiotics/medication had an infection in the last two weeks had hepatitis or jaundice had a tattoo had acupuncture been to areas where malaria is found after major surgery complicated dental work after certain immunisations pregnant/had a baby in last 9 months Do not accept 'under 18'	2	2		
	(c)	Any one from: haemophiliac/blood clotting disorder HIV positive or suspect you could be have ever had syphilis, HTVL (Human T – lymphotropic virus), hepatitis B or C a man who has had sex with another man ever worked as a prostitute ever injected drugs Not: if you have diabetes	1	1		
5.	(a)	Used for other conditions or disorders/ wasted	1	1		
	(b)	plot (2) axes labels + units (1) scale and orientation (1)	4		4	

Question	Answer	Marks	AO1	AO2	AO3	Question
6.	(a)	Prevent/kill spread of bacteria/infection Sterilise skin to kill bacteria but not just sterilise skin	1	1		4
	(b)	Hazard: needle Risk: Cuts/puncture wounds Hazard: blood Risk: Transmission of blood borne disease (named examples acceptable)	4			
	(c)	To prevent too much blood loss higher blood pressure in artery	2	2		
	(d)	Trace donor who has a blood disorder/medical condition (1) which is found on screening blood (1)	2		2	
7.	(a)	Haemocytometer	1	1		2
	(b)	Include cells touching left and top border Exclude cells touching right and bottom border (or vice versa)	1	1		
	(c)	Blood sample may not be uniform, <u>improves</u> reliability of result	2			
	(d)	rbc too low/anaemic / dangerous to lose too many more blood cells / not adequate amounts to donate	1	1		
Total			34	20	8	6

Section B

Question		Answer	Marks	AO1	AO2	AO3
8.	(a)	W Tidal Volume X Vital Capacity	2	2		
	(b)	Peaks close/higher frequency bigger/higher (must refer to trace not breathing)	2	2		
	(c)	Some air always remains in the lungs/called residual air; so can't be recorded on the trace as no movements/only measures air taken in and out	2	2		
	(d)	Peaks closer/shorter	1	1		
9.	(a)	A Aorta B Cardiac muscle/ <u>left</u> ventricle C coronary artery	3	3		
	(b)	(i) Supplies blood to <u>heart muscle</u>	1	1		
		(ii) Any two from: Increased oxygen (not more blood); Increased glucose/nutrients; Remove carbon dioxide				
(c)	(i) Y					
	(ii) Sino atrial node/SAN (not pacemaker)					
10.	(a)	Any two answers from: bladder function test blood flow tumour location parental examination joint scanning detection kidney stones	2		2	
	(b)	Any four from: The ultrasound machine transmits <u>high-frequency</u> sound pulses through the body The sound waves hit a boundary between tissues Some of the sound waves get reflected back to the probe Some travel on further until they reach another boundary and get reflected	4	4		

Question		Answer	Marks	AO1	AO2	AO3			
10.	(b) (contd)	The reflected waves are picked up by the probe and relayed to the machine The machines calculated the distance from the probe to the tissue or organ The image is constructed by computer and displayed on screen							
	(c)	Any two benefits: <u>non-ionising</u> radiation technique no (known) harmful side-effects good for imaging soft tissue non-invasive real-time images/immediate result <u>relatively</u> cheap/cheaper (not just 'cheap') widely available/portable measure movements (e.g. blood flow, fluid flow) Any two disadvantages: All ultrasound reflected at the air/tissue interface Nothing can be seen beyond bone Low resolution Max of 2 marks for benefits or disadvantages	3	3					
	(d)	Method (either: 8.2 x 100/105 or 8.2 x 95/100) answer = 7.79/7.8 million (if answer is correct award both marks)	2	2					
11.	(a)	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">P</td> <td style="padding: 5px;">T</td> <td style="padding: 5px;">QRS</td> </tr> </table> <p>(1 mark per correct square)</p>	P	T	QRS	3	3		
	P	T	QRS						
	(b)	0.4 second/s	1		1				
	(c)	A	1	1					
	(d)	For: Increase life expectancy better quality of life/pain relief AVP	1		1				
	Against: Medical procedures could be dangerous / anaesthetics may have complications / may have poor quality of life post surgery getting an infection in hospital	1		1					

Question		Answer	Marks	AO1	AO2	AO3
	(e)	ensures that doctor tells patient/patient is informed/ provide legal protection	1		1	
12.	(a)	J trachea/bronchi L Alveoli (2 correct positions either labelled with correct name or letter)	2	2		
	(b)	J : Ciliated/hair-like projections/mucus(1) – sweep mucous/dirt/dust/bacteria along (1) L : Large surface area (Not: alveoli)/moist surface(1) – gas exchange (1)	4	4		
	(c)	Any three from: naming of gas exchange surface/ alveolar surface/ blood; diffusion; concentration gradient; oxygen moves from air space to blood; carbon dioxide from blood to air space	3	3		
	(d)	Reduces/maintains surface tension (1) (Not: Increase) prevents lining of alveolus sticking together/allows alveoli to expand/allow reference to alveoli collapsing. (1)	2	2		
	(e)	Premature babes	1	1		
Total			46	42	4	



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