



GCE MARKING SCHEME

**APPLIED SCIENCE
AS/Advanced**

SUMMER 2014

INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2014 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.

GCE APPLIED SCIENCE
MARK SCHEME – SUMMER 2014

SECTION A

Question		Answer	Marks
1		Three ways need to be stated for 1 mark: Donation after brain stem death. Donation after cardiac death. Live organ donation.	1
2		Benefit One of: <ul style="list-style-type: none"> • More organs available for transplantation • Family does not have to make a difficult decision upon death of a relative. Problem <ul style="list-style-type: none"> • Takes away the role of the family in the consent process. 	2
3	(a)	Given to someone who has a damaged organ/given to save a life/or improve the quality of life	1
	(b)	Any two of: <ul style="list-style-type: none"> • patients having to take immuno-suppressants for the rest of their life • immuno-suppressants give increased risk of developing cancer or infections • prolonged wound pain • depression / anxiety • rejection of organ could occur. 	2
4	(a)	Organs last longer. Survival rates are also increased / patients live longer.	2
	(b)	Prevents exploitation of donor/ any reference to fairness to recipient	1
5	(a)	Heart / liver.	1
	(b)	<u>Tissue type</u> not compatible.	1
6	(a)	(i) Heart.	1
		(ii) Any one of: <ul style="list-style-type: none"> • heart disease is a common cause of death. • other organs donated first. • emotions of family 	1
	(b)	Any two of: <ul style="list-style-type: none"> • we have two kidneys • donors have died of causes other than kidney disease • possibility of live donors. 	2

Question		Answer	Marks	
7	(i)	Use of correct data. (1) Clarity of table with correct headings and units. (1) <i>Should be a single table</i>	2	
	(ii)	Scale (1) <i>Only 1 mark max for scale if a line graph is drawn</i> Axis (1) Plots (1)	3	
8		Avoid rejection.	1	
9	(a)	Any three of: <ul style="list-style-type: none"> oxygen diffuses across alveolar wall oxygen diffuses into capillaries carried by red blood cell / erythrocytes attached to haemoglobin. 	3	
	(b)	(i)	Vena Cava: returns (deoxygenated) blood to the right atrium.	1
		(ii)	Tricuspid valve: prevents backflow of blood from right ventricle to right atrium (must mention one of the chambers).	1
		(iii)	<u>Transmits the electrical impulses</u> from the AVN/ to the apex of the heart.	1
10	(a)	Narrowing or blockage (1) of the <u>coronary</u> arteries. (1)	2	
	(b)	Any two of: <ul style="list-style-type: none"> smoking family history hypertension obesity diabetes high alcohol consumption lack of exercise stress AVP high fat diet (Not: bad diet). 	2	
11		Two of: Hepatitis, CJD and HIV.	1	
Total			32	

SECTION B

Question			Answer	Marks
12	(a)	(i)	Higher than 15 but not higher than 50.	1
		(ii)	123-125	1
	(b)	% increase: $61/71 \times 100 (1) = 85.92 (1) \%$ accept 85.9/86%	2	
	(c)	Any four of: <ul style="list-style-type: none"> • increased demand for oxygen • increased demand for energy (accept ATP) • increased aerobic respiration • reference to muscles • increased air into lungs • increased volume of blood pumped around • increased glucose supply • removal of carbon dioxide • remove heat. 	4	
(d)	Any one of: <ul style="list-style-type: none"> • reduces risk of heart attack (OWTTE) • prevents hypertension / high blood pressure • decreases resting heart rate • increases cardiac output. 	1		
13	(a)	A vein B bronchiole C artery.		3
	(b)	Any two of: <ul style="list-style-type: none"> • thin • moist • good blood supply • large surface area. 	2	
	(c)	Endothelial cells (1) Any one of: Barrier, prevents clotting, smooth surface/reduce friction.	2	
	(d) (i)	Any two of: <ul style="list-style-type: none"> • fewer / ruptured / collapsed alveoli • larger air spaces • smaller surface area. 	2	
	(ii)	Less oxygen taken in / less carbon dioxide removed. (NOT just 'less').	1	

Question			Answer	Marks
	(e)	(i)	Any two of: <ul style="list-style-type: none"> • clean mouthpiece • zero the meter • take a minimum of at least three readings • deep breath in • patient blows out as hard as possible (into the mouthpiece). 	2
		(ii)	Decreased.	1
14	(a)		Any two of: <ul style="list-style-type: none"> • shortage of breath / difficult to breathe/lower vital capacity • persistent / constant cough • coughing up blood • chest pain / pain when breathing • weight loss • tiredness. 	2
	(b)	(i)	CAT scan. X-ray	2
		(ii)	Does not use <u>ionising</u> radiation.	1
15	(a)		Any two of: <ul style="list-style-type: none"> • haemoglobin / haem • large SA or biconcave disc • no nucleus. 	2
	(b)		Clotting	1
	(c)		Plasma (1)	3
			Any two of: (2) <ul style="list-style-type: none"> • carries CO₂ • carries heat • carries glucose • carries hormones • carries nutrients • carries protein. 	
	(d)	(i)	Haemocytometer.	
		(ii)	Count left and top edges. Ignore right and bottom edges. OWTTE.	2

Question			Answer	Marks
16	(a)		Excitation produced spontaneously, without requiring stimulation from nerve cells	3
	(b)	(i)	SAN, AVN, Purkinje fibres labelled in correct region. (<i>Purkinje fibres should be across two sides</i>)	1
		(ii)	Any three of: <ul style="list-style-type: none"> • across both atria • from SAN to AVN • from AVN down septum • from apex up sides of ventricles (both) <i>Accept ecf.</i> <ul style="list-style-type: none"> • 	3
	(c)		Any two of: <ul style="list-style-type: none"> • insulation • prevents direct transfer of wave of excitation to ventricles • prevents atria and ventricles from contracting at the same time • causes contraction of ventricles from base. 	2
	(d)		ECG	1
	(e)	(i)	Bradychardia	1
		(ii)	SAN	1
			Total	48



WJEC
245 Western Avenue
Cardiff CF5 2YX
Tel No 029 2026 5000
Fax 029 2057 5994
E-mail: exams@wjec.co.uk
website: www.wjec.co.uk