



GCE MARKING SCHEME

**APPLIED SCIENCE
AS/Advanced**

SUMMER 2015

INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2015 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
Summer 2015 Mark Scheme

Question	Answer	Marks
1	Any three of: <ul style="list-style-type: none"> • Chest pain/angina • Heart attack • Palpitations • (Unusual) breathlessness • Heart failure 	3
2 (a) (i) (ii)	Coronary artery Oxygen/(named) nutrients	2
(b)	Less <u>oxygen</u> in the blood/ less <u>oxygenated</u> blood to the cardiac muscle / heart	1
(c)	<ul style="list-style-type: none"> • Nitrates dilate/widen the <u>arteries</u> to the heart/vasodilate • <u>Increasing</u> blood flow (OWTTE) 	2
3	4.15% accept 4.2% but not 4.0%	1
4 (a)	<i>Systolic</i> : the maximum arterial pressure (occurring during contraction of the left ventricle of the heart) <i>Diastolic</i> : The minimum arterial pressure (due to relaxation of the ventricles)	2
(b)	Andrew (no marks for name) <ul style="list-style-type: none"> • Systolic pressure of more than {135-140} mmHg • Diastolic pressure of more/higher than {80-90} mm Hg 	2
(c)	Any two of: <ul style="list-style-type: none"> • Smoking • <u>High</u> cholesterol • Diabetes • <u>Lack of</u> exercise • Obesity • Family history of CHD • High blood pressure • Thrombosis 	2

Question	Answer	Marks
5	Veins have wider lumen therefore less likely to be blocked/veins carry blood back to heart at low pressure so less likely to deposit material (accept reverse argument)	1
6 (a)	QRS: Ventricular excitation (prior to contraction) T wave: Ventricular repolarization (prior to relaxation)	1 1
(b)	Uncontrolled/uncoordinated	1
7 (a)	Any three of: <ul style="list-style-type: none"> • X-ray/radiation passes through body/ soft tissue • Different tissues absorb different amounts of X-rays • Image dark where most gets through/shadow image/bones white or light grey/bones give better contrast • Radiation/X-ray produces an image 	3
(b)	Any two of: <ul style="list-style-type: none"> • Leave area of scanner when operating • Limit exposure • Wear a <u>lead</u> apron • Stand behind <u>lead</u> glass screen • Focus X-rays 	2
(c)	For looking at soft tissue Contrast medium absorbs X-rays	2
8 (a)	Increasing	1
(b)	Coronary bypass – decreasing Angioplasty – increasing	2
(c)	Any two of: <ul style="list-style-type: none"> • More drug intervention therefore less coronary bypass • Increased awareness of factors causing CHD therefore less coronary bypass • PCI increased therefore less coronary bypass 	2
	Total	31

Section B

Question	Answer	Marks
9 (a)	Bronchiole	1
(b)	Any three of: <ul style="list-style-type: none"> • Intercostal muscles contract • Ribs move up and out • Diaphragm flattens • volume of thorax increases • Pressure in lungs decrease 	3
(c) (i)	Any three of: <ul style="list-style-type: none"> • Increased/excess mucus • Inflammation of bronchioles/ Swelling • Reduced air flow • Decreased cross sectional area/narrowing of airways 	3
(ii)	Any two of: <ul style="list-style-type: none"> • Wheezing • Shortness of breath/difficulty breathing • Tightness of chest • Coughing 	2
(d)	<ul style="list-style-type: none"> • Peaks closer • Shorter 	2
(e) (i)	Any two of: <ul style="list-style-type: none"> • Reduce inflammation • Reduces mucus (not: clears mucus) • Relaxation of (smooth) muscle 	2
(ii)	Alveoli are affected/damaged, not bronchioles/emphysema not a muscular problem/emphysema is irreversible	1

Question	Answer	Marks
10 (a)	Any two of: <ul style="list-style-type: none"> • Infected blood • Needle • Slide/cover slip 	1
(b) (i)	Both correctly labelled – 1 mark each	2
(ii)	Erythrocyte- carries oxygen/carbon dioxide(1) Leucocyte – make antibodies/fights infection (1)	2
(c)	<u>Biconcave</u> disk – increased surface area No nucleus – more space to carry oxygen/haemoglobin Haemoglobin present – binds oxygen Two adaptations and two explanations – 1 mark for each (independent marks)	4
(d) (i)	Increase = $6.15 - 4.85 = 1.3$ (1) $\% = 1.3/4.85 \times 100 = 27/26.8$ (1) Correct ans = 2 marks	2
(ii)	Any two of: <ul style="list-style-type: none"> • More haemoglobin • more oxygen to body/tissues/cells/(named) muscle • more (aerobic) respiration • more energy release/ATP production; 	2

Question	Answer	Marks
11 (a) (i)	<p>X Vena Cava – carries blood back to <u>RA</u> from <u>body</u></p> <p>Y Right Ventricle –(receives blood from RA) and <u>pumps to lung/through Pulmonary artery</u></p> <p>Z Bicuspid/Mitral/Atrio-ventricular Valve – <u>prevents back flow of blood</u> from <u>(left) ventricle/into (left) atrium</u></p> <p>Three correctly identified + three functions</p> <p>Mark all independently.</p>	6
(ii)	<p>A deoxygenated</p> <p>B oxygenated</p> <p>Both must be correct for 1 mark</p>	1
(b) (i)	<p>Blood flows twice through the heart per one cycle (of the body) / <u>pulmonary</u> (circulation) to lungs <u>and systemic</u> (circulation) to body.</p>	1
(ii)	<p>Any two of:</p> <ul style="list-style-type: none"> • separation of oxygenated and deoxygenated blood • helps maintain, (high blood) pressure OR (too high a) pressure does not damage lungs • rapid circulation • efficient oxygen transport • greater activity possible 	2

Question	Answer	Marks
12 (a)	Axes labelled (1) Scale (1) Plot (2)	4
(b) (i)	Never worked/long-term unemployed	1
(b) (ii)	Any three of: <ul style="list-style-type: none"> • Increased awareness of conditions caused by smoking • Increased cost of cigarettes • Ban in public places • Ban on advertising • Ban on displays in supermarkets • Increased use of e-cigarettes 	3
(c)	Any two of: <ul style="list-style-type: none"> • Participating in exercise/lack of exercise • Age (qualified) • Emotions/anxiety/adrenaline • Lack of food • Lack of water/dehydration • Medication/caffeine • Temperature • Recent illness • Pregnancy 	2
(d)	For – improved health AVP Against – personal choice AVP	2
	Total	49



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