GCE MARKING SCHEME

SUMMER 2016

GCE APPLIED SCIENCE - ASC1
1661/01

INTRODUCTION

This marking scheme was used by WJEC for the 2016 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was 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 conference was to ensure that the marking scheme was 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' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

GCE APPLIED SCIENCE - ASC1

MARK SCHEME - SUMMER 2016

SECTION A

Question		Answer	Mark
1		squamous cell (carcinoma) adenocarcinoma large (lung) cell (carcinoma) (1 mark for all three answers)	1
2		persistent cough (OWTTE) a long-standing cough that gets worse persistent chest infections coughing up blood ache or pain when breathing or coughing persistent breathlessness persistent tiredness or lack of energy loss of appetite or unexplained weight loss changes in the appearance of the fingers a high temperature (fever) of 38°C or above difficulty swallowing or pain when swallowing wheezing a hoarse voice swelling of your face or neck persistent chest or shoulder pain [any 2 for 1 mark]	1
3		$\frac{41\,000}{70\,000\,000} \times 100$ (1) = 0.059 % (accept 0.06) (1)	2

<table>
<tr><th colspan="2">Question</th><th>Answer</th><th>Mark</th></tr>
<tr><td>4</td><td></td><td>
<table>
<tr><th>Intercostal muscles</th><th>Contract</th><th>Relax</th></tr>
<tr><td>Ribs</td><td>Up <u>and</u> out</td><td>Down <u>and</u> in</td></tr>
<tr><td>Diaphragm</td><td>moves down/flattens</td><td>moves up/dome shaped</td></tr>
<tr><td>Volume</td><td>increases</td><td>decreases</td></tr>
<tr><td>Pressure</td><td>decreases</td><td>increases</td></tr>
</table>
(one mark per row)
</td><td>4</td></tr>
<tr><td>5</td><td>a</td><td>
• both rise (between 1920 and 1960)
• men started smoking before women or 1900 / women's smoking started increasing after 1920 - 1925
• similar levels of smoking in men and women by 1990
• smoking in men now levelled off / smoking in women continues to rise
(any 2 with clear comparison)
</td><td>2</td></tr>
<tr><td></td><td>b</td><td>
• The increase in incidence of lung cancer lags behind increase in smoking
• once smoking has levelled off there is a corresponding levelling off in incidence of lung cancer
• men always smoking more than women and men having higher rates of cancer
• increased smoking causes increase in lung caner
(any 2)
</td><td>2</td></tr>
<tr><td>6</td><td></td><td>
Increased number of (white blood cells / leucocytes) compared to normal / (wbc) count of greater than $11 \times 10^9\,dm^{-3}$ (1)

(wbc) produce antibodies / function in defence/ part of immune system (1)
</td><td>2</td></tr>
<tr><td>7</td><td>a</td><td>
• The patient should be seated
• A nose clip should be attached
• The mouth<u>piece</u> is placed into the patient's mouth
• measurement of tidal volume should be performed first
• The patient breathes in and out normally
• followed by forced vital capacity measurements;
• A large breath to full inspiration is taken through mouth;
• the patient should breathe out hard and quickly until all air is expelled

(any 3 points (3) in correct sequence (1))
</td><td>4</td></tr>
</table>

Question		Answer	Mark
	b	(i) BC (ii) AD	2
	c	Vital capacity smaller (ignore all other annotations)	1
8	a	• X-ray/radiation passes through body /soft tissue • Radiation / X-ray produces an image / picture on film or detector • X-ray film / image / picture acts as a record • image dark where most x-rays get through / shadow image / bones white or light grey / bones give better contrast • different tissues absorb different amounts of X-rays • bones/denser material, absorbs more radiation • soft tissues absorb less radiation (any 3)	3
	b	wear badge /dosimeter to monitor radiation leave area of scanner when operating wear a lead apron Stand behind lead glass screen control overall dose / limit exposure focus x-rays (any 2)	2
	c	help distinguish selected areas of the body from surrounding tissue / allows imaging of soft tissue	1
9		**Benefits (1):** increase life expectancy better quality of life / pain relief Removes cancerous cells / removes tumour AVP **Risks (1):** medical procedures could be dangerous anaesthesis may have complications may have poor quality of life post-surgery getting an infection in hospital AVP	2
Total			**29**

SECTION B

Question		Answer	Mark
10	a	D – 7438 Total – 59 570	1
	b	Bar chart (1) Plot (1) Scale on y axis (1) Labelled (1) (2 marks max for line graph)	4
	c	Men higher than women for each board	1
	d	Lowest population AVP	1
	e (i)	smoking high cholesterol high fat diet lack of exercise stress diabetes obesity having a family history of CHD (any 2)	2
	e (ii)	Function – supply cardiac muscle with blood/oxygen (1) Location – outside heart (1)	2
	e (iii)	Restricted blood flow (1) Less oxygen to cardiac muscle (1) (Do not accept narrowing of arteries)	2
	e (iv)	better treatments, e.g. clot busting drugs/warfarin Surgery more successful (e.g. Angioplasty/ By-pass surgery) Improved awareness/ education as to risks of smoking / poor diet / comparative increase of use of e-cigarettes instead of conventional cigarettes; Better / improved monitoring qualified e.g. blood pressure checks / cholesterol; (any 2)	2

Question		Answer	Mark
11	a (i)	5 beats in 4 s / 5/4 x 60 (1) = 75 beats per min (1)	2
	a (ii)	Tachycardia - Peaks / QRS closer / more bpm (1) Bradycardia - Peaks / QRS further / less bpm (1)	2
	b (i)	Correctly marked P wave	1
	b (ii)	Atrial systole / excitation of the atria	1
	c (i)	SAN – in right atrium (1) Purkinje – in walls of <u>both</u> ventricles (1)	2
	c (ii)	(Excitation) starts at SAN Across both atria To AVN Down bundles of His Up purkinje fibres (from apex) (any 3)	3
12	a	I / J J/C E	3
	b	Diffusion (1) Oxygen from <u>alveolus</u> into blood (1) Carbon dioxide from blood into <u>alveolus (1)</u>	3
	c (i)	Moist Good blood supply / rich capillary network Surfactant Large surface area Thin wall / one cell thick (any 3)	3
	c (ii)	Moist - gases dissolve into lining fluid Good blood supply - maintains diffusion gradient; surfactant – reduces surface tension Large surface area - increases area for diffusion Thin wall - reduces diffusion distance/ short diffusion paths (any 2)	2

Question		Answer	Mark
13	a (i)	A Artery B Vein	2
	a (ii)	close proximity to muscles – prevents pooling/squeezing effect smooth endothelium, - to reduce friction / resistance to blood flow wider lumen – reduce friction / resistance to blood flow valves - to prevent backflow **;** (1 mark per adaptation and 1 for corresponding importance)	4
	b (i)	X – Capillary Y – Tissue fluid	2
	b (ii)	Low velocity blood flow Porous/leaky Thin wall / only one cell thick (any 2)	2
	c (i)	Erythrocyte	1
	c (ii)	Carry oxygen	1
	c (iii)	RBC too big to cross capillary wall Therefore no RBC in tissue fluid	2
Total B			**51**