

Human Biology

Advanced GCE **2866/01**

Energy, Control and Reproduction

Mark Scheme for June 2010

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of pupils of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support which keep pace with the changing needs of today's society.

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by Examiners. It does not indicate the details of the discussions which took place at an Examiners' meeting before marking commenced.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

© OCR 2010

Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

Question			Expected Answers	Marks
1	(a)	(i)	A matrix ; B crista ; C ribosome ;	[3]
		(ii)	1.30 / 1.32 / 1.34 (µm) ; ; If answer incorrect allow one mark for $\frac{65 / 66 / 67 \times 1000}{50\,000}$ or $\frac{6.5 / 6.6 / 6.7 \times 10\,000}{50\,000}$	[2]
	(b)		D / E / D and E ; G ; F ; H ;	[4]
	(c)		only, 2 / 4 / few / much less, ATP formed ; no (additional) ATP after glycolysis / no electron transport chain / no oxidative phosphorylation / no Krebs cycle ; energy, still locked up / remains in lactate ; incomplete oxidation / needs to be oxidized further ; A breakdown	3 max
	(d)	(i)	ring drawn around adenine, ribose and proximal phosphate ;	[1]
		(ii)	active transport ; muscle contraction / movement ; nerve conduction ; anabolic reactions ; AVP ;; any suitable example e.g. aerobic respiration, protein synthesis	2 max
				[Total: 15]

Question		Expected Answers	Marks
3	(a)	ganglion cells - S ; collagen fibres - P ; bipolar neurones - R ;	[3]
	(b)	c ₁ 425 nm ; c ₂ 530 nm ;	[2]
	(c)	c ₃ are most sensitive to green colour light (not red) ;	[1]
	(d)	blue colour perception requires, stimulation of / action potential from, 'blue' cones <u>and</u> 'green' cones ; violet colour perceived due to stimulation of 'blue' cones alone ;	[2]
			[Total: 8]

Question			Expected Answers	Marks
5	(a)	(i)	T cerebral, hemispheres / cortex / cerebrum ; U medulla (oblongata) ; V cerebellum ;	[3]
		(ii)	(CT) scan uses X-rays ; different structures absorb X-rays to different degrees / AW ; several beams from different angles ; computer, puts the X-ray pictures together / generates 3D image ; may be given injection of (X-ray opaque) dye ; to show blood vessels ; <i>3 max</i> detailed picture / detail e.g. slices / colours ; shows, structural damage / e.g. of structural damage ; shows, tumours / blood clots / loss of brain cells ; shows, haemorrhage / stroke damage ; <i>3 max</i> AVP ; e.g. non-invasive compare with normal brain	5 max
	(b)		diamorphine / heroin, is similar in structure to / mimics, enkephalins / endorphins ; neurotransmitters ; modify the perception of pain (from all parts of the body) ; (diamorphine / heroin) combines with / AW, receptors in cell membranes ; enkephalin / endorphin / opiate, receptors ; prevents sensory neurone sending impulse to pain centre / AW ; AVP ; e.g. effect takes longer than natural neurotransmitter inhibits pain receptors mimics endorphins	3 max
			continued	

Question 5 cont'd		Expected Answers	Marks
	(c)	<p><i>psychological</i></p> <p>1 (compulsion) to use the drug / alcohol, for favourable effect / euphoria ;</p> <p>2 cannot cope with <u>stress</u> of being without drug ;</p> <p>3 escape from reality ;</p> <p>4 reduce, stress / anxiety / inhibitions ;</p> <p>5 emotional attachment to drug / used as a prop ;</p> <p>6 changes in, behaviour / lifestyle, so life revolves around drug taking ;</p> <p>7 enjoys these changes ;</p> <p>8 only mild discomfort / no serious physical effects on withdrawal ;</p> <p>9 AVP ; e.g. specific example for alcohol 4 max</p> <p><i>physical</i></p> <p>10 idea that body does not operate properly without drug / drug necessary for normal metabolism / AW ;</p> <p>11 continued use necessary to prevent withdrawal symptoms ;</p> <p>12 named withdrawal symptom from heroin ; e.g. anxiety / craving / perspiration / gooseflesh / shivering / pupil dilation / muscle tremors / insomnia / restlessness / vomiting / diarrhoea / dehydration / weight loss / increase in BP / heart rate / respiratory rate / temperature / hypersensitive to pain</p> <p>13 dependence on heroin develops very quickly ;</p> <p>14 named withdrawal symptom from alcohol ; e.g. rebound excitability / morning shakes / tremors / agitation / hallucinations / confusion / delirium tremens (DTs)</p> <p>15 physical dependence preceded by psychological dependence in alcohol addiction ; 4 max</p> <p>16 both cause social problems / e.g. ;</p> <p>17 both may develop tolerance ;</p> <p>18 AVP ; e.g. use of methadone for heroin 7 max</p> <p>QWC – legible text with accurate spelling, punctuation and grammar ; <i>no more than 3 different spelling errors</i> 1</p>	
			[Total: 19]

Question		Expected Answers	Marks
6	(a)	M photosynthesis ; N respiration / decomposition ;	[2]
	(b)	(rain) forests act as, carbon sinks / reservoirs ; less carbon dioxide used in photosynthesis ; more carbon dioxide released (as a result of burning) ;	2 max
	(c)	soil contains <u>decomposer</u> ; extracellular digestion ; by fungi / bacteria ; ref to enzymes ; leaf litter provides respiratory substrate / leaf litter decomposes ; release of carbon dioxide by respiration ; AVP ; e.g. ref to, soil fertility / other organisms	3 max
	(d)	blanket of carbon dioxide allows, high energy / short λ rays, to enter atmosphere ; reflected, lower energy / longer λ rays, cannot escape ; 'global warming' / temperature of atmosphere rises ; melting of (Antarctic / polar) ice caps ; expansion of water in oceans / rising sea levels ; flooding of low-lying areas ; climate change / increase in extreme weather conditions ; affects on distribution of, plant species / animal species / biodiversity ; effect on agriculture ; pests may increase in warmer conditions ; more tropical pests in temperate climates ;	3 max
			[Total: 10]

Paper Total 90

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

14 – 19 Qualifications (General)

Telephone: 01223 553998

Facsimile: 01223 552627

Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

Oxford Cambridge and RSA Examinations
is a Company Limited by Guarantee
Registered in England
Registered Office; 1 Hills Road, Cambridge, CB1 2EU
Registered Company Number: 3484466
OCR is an exempt Charity



OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553