OCR
RECOGNISING ACHIEVEMENT

GCSE

Biology B

General Certificate of Secondary Education

Unit **B632/02**: Modules B4, B5, B6 (Higher Tier)

Mark Scheme for June 2011

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The **Abbreviations, annotations and conventions** used in the detailed Mark Scheme are:

/	=	alternative and acceptable answers for the same marking point
(1)	=	separates marking points
not	=	answers which are not worthy of credit
reject	=	answers which are not worthy of credit
ignore	=	statements which are irrelevant
allow	=	answers that can be accepted
( )	=	words which are not essential to gain credit
__	=	underlined words must be present in answer to score a mark
ecf	=	error carried forward
AW	=	alternative wording
ora	=	or reverse argument

Question			Expected Answers	Marks	Additional Guidance
1	a		little / lack of oxygen / O_2 (1) OR microbes / decomposers cannot respire (1)	1	**allow** no oxygen **ignore** references to air / aeration if use formula must be correct **ignore** no microbes / decomposers **allow** correct alternatives to decomposer: bacteria / fungi / saprophytes **not** germs **allow** (too) acidic / wrong pH (1) **ignore** alkaline **ignore** lack of water
	b		stop / slow down growth / reproduction / respiration (of decomposers) (1)	1	**allow** stop / slow down (chemical) reactions / enzymes **allow** less energy for (chemical) reactions / enzymes **ignore** stop / slow down microbes working / microbe activity **ignore** just 'microbes have less energy'
	c	i	protein (1)	1	**allow** ammonium (compounds) / ammonia / nitrites / urea / amino acids / peptides / DNA **ignore** ammonium **nitrate** **allow** a named protein or amino acid
	c	ii	carbon dioxide / methane (1)	1	**allow** correct formulae **allow** biogas / hydrogen sulfide / ammonia
	d	i	denitrifying (bacteria) (1)	1	**allow** anaerobic (bacteria) **allow** *Pseudomonas*
	d	ii	nitrogen (gas) / N_2 (1)	1	**ignore** N **allow** ammonia / ammonium (compounds) / nitrites
	e		no – takes a long time to form / takes 1000s of years to form / not renewable / not sustainable / it's a finite resource (1)	1	**allow** yes – it does not take millions of years to form **ignore** yes – made from organic matter
			Total	**7**	

Question			Expected Answers	Marks	Additional Guidance
2	a		(energy lost as) heat / respiration / movement / egestion / excretion / not all corn eaten / not all (parts of) chickens eaten / not all food digested (1)	1	**not** growth **ignore** 'waste' unqualified **allow** named excretory product **allow** example of active process eg eating / hunting / digestion
	b	i	10 (%) (1)	1	
	b	ii	0.5 (%) (1)	1	
	c		get **more** energy / **less** energy lost / can feed **more** people (1)	1	**must** be comparative **allow** corn has more energy **ignore** references to biomass **not** no energy lost
	d		less growth / take longer to grow / fewer eggs / need more food / AW (1) **more** energy used (for movement) / **more** respiration / **more** heat lost / **more** energy lost (1)	2	**ignore** ideas of predation / more land needed / eggs getting lost **ignore** fewer chickens **allow** idea that **less** energy transferred to rest of food chain **ignore** profit / yield unless qualified
			Total	**6**	

Question			Expected Answers	Marks	Additional Guidance
3	a		low (sugar) conc / 0.2 (M) **very** high (sugar) conc / 0.8 (M) (1)	1	both needed for 1 mark **allow** 'the first one, 'the last one'
	b		water moves in (to the potato) (1) from high**er** water concentration (in solution) / solution has a high**er** water concentration / to low**er** water concentration (in potato) / potato has a low**er** water concentration (1)	2	**not** solution moves in **allow** (sugar) solution is more dilute than the potato / potato has a more concentrated solution than the (sugar) solution (i.e. assume unqualified references to concentration refer to sugar concentration)
	c	i	A (1)	1	
	c	ii	turgid (1)	1	
	c	iii	chloroplasts (1)	1	**ignore** chlorophyll
	c	iv	(xylem) is hollow (lumen) / has no cytoplasm / has no organelles / has thick (cell) wall / has strong cell wall (1)	1	**ignore** just 'lumen' / 'thick' / 'strong' **allow** lignified **allow** no end walls / tubular **allow** xylem is dead **ignore** elongated
			Total	**7**	

Question			Expected Answers	Marks	Additional Guidance
4	a		clotting (1)	1	**ignore** agglutination / coagulation / congeal / clumping
	b		idea that blood passes through heart twice on one journey round the body / blood goes from heart to lungs to heart to body (1)	1	**ignore** two circuits
	c		**any one from:** blood made by liver / heart (1) blood used up (in organs) (1) blood constantly produced (to replace blood used up) (1) blood flows from heart or liver / blood flows to organs / one-way blood flow (in different systems) (1) two types of blood / different blood in arteries and veins (1) blood passes (through pores in septum) between ventricles (1)	1	**allow** blood flows back and forwards / tidal flow **ignore** references to whether the heart is a pump or not **ignore** oxygenated and deoxygenated blood
	d		pacemaker (1)	1	**allow** SAN / AVN
	e	i	4 (1)	1	
	e	ii	83 (1)	1	
	f		(presence of) antibody a (in blood group O) and antigen A (on the group A red blood cell) (1)	1	**allow** upper or lower case A or a for either antigen or antibody **allow** anti-a as alternative for antibody a **allow** agglutinin a as alternative for antibody a
			Total	**7**	

Question			Expected Answers	Marks	Additional Guidance
5	a	i	synovial (fluid) (1)	1	
	a	ii	lubricant / reduce friction / act as a shock absorber (1)	1	**allow** stop (bones) rubbing **ignore** just 'movement' or 'helps movement'
	b		synovial / hinge (1) triceps (1) antagonistic (1)	3	**allow** moveable
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
6	a		(made in) liver (1) (from) amino acids / proteins (1)	2	 **allow** ammonia / nitrogen compounds / ammonium (compounds) **allow** named proteins or amino acids **ignore** carbon dioxide
	b		**more** ADH released (1) kidney reabsorbs **more** water / kidney absorbs **more** water (back) into the blood (1)	2	**allow** too much ADH released **allow** kidney reabsorbs too much water **allow** ADH makes kidney tubules **more** permeable (1)
	c		they have two of them / can survive with one kidney (1)	1	
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
7	a		gills do not work (out of water / in air) / gills need water to work / gills take oxygen out of water (1)	1	**allow** gills dry up / gills stick together / gills (out of water) have a lower (exposed) surface area **ignore** it does not have lungs
	b		**any two from:** several gills / (many) filaments - large (surface) area (1) rich / good blood supply / rapidly moving blood / large number of capillaries - maintain concentration gradient / rapid removal of oxygen (to body) / rapid removal of carbon dioxide (from gills) / AW (1) thin (membrane) - short diffusion pathway / greater concentration gradient / gases don't have far to travel / AW (1) idea of counter current - maintain concentration gradient (1)	2	must have the adaptation and the explanation for mark read whole answer for adaptation & explanation **ignore** gill bars **allow** valid description of filaments e.g.' feathery – larger SA' **ignore** moist / permeable **ignore** unqualified references to more diffusion
			Total	**3**	

Question			Expected Answers	Marks	Additional Guidance
8	a		heating (water / house / cooking etc) / (fuel for) vehicles (1)	1	**allow** valid examples e.g. 'cookers' / 'central heating systems' **ignore** power machines **ignore** fuel (in question) **ignore** just 'for burning'
	b		is **more** flammable / burns **more** easily / releases **more** energy / ORA (1) (above 50%) not explosive / lower % is explosive (1)	2	**ignore** more efficient
	c		(cell) **B** (1)	1	**allow** cell B ringed in table
	d		150 (2) BUT 5 x 4.5 or 22.5 or 4.5 / 0.15 or 30 (1)	2	
			Total	**6**	

Question			Expected Answers	Marks	Additional Guidance
9	a		$C_6H_{12}O_6 \longrightarrow 2C_2H_5OH + 2CO_2$ correct formulae (1) balanced (1)	2	mark for balancing is dependent on first mark, but if all correct but clearly lower case C or O (1) (lower case h = 0)
	b	i	increase in temperature causes faster reproduction / ORA (1)	1	**allow** can reproduce quicker in warmer conditions **allow** growth as an alternative to reproduction **ignore** it makes reproduction faster
	b	ii	(10^0C rise in temperature) **doubles** (the rate of yeast reproduction) (1)	1	**ignore** alcohol production doubles / reaction rate doubles **allows** it doubles **allow** nearly doubles / approximately double **not** more than doubles
	c		**any one from:** alternative source to fossil fuels / renewable / sustainable / conserve resources (1) less / no (net) carbon dioxide produced (compared with fossil fuels) / carbon-neutral (1) less / no particulates produced (1) less / no pollution (1) saves on transport costs (1) uses up waste products (e.g. sugar canes waste) (1)	1	**allow** less / no greenhouse gases **ignore** less / no harmful gases
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
10	a	i	fertiliser (from farm A) causes (rapid) algal growth or eutrophication (1) **plus one from:** decay bacteria / decomposers use up oxygen (1) less light so less photosynthesis (1)	2	**allow** fertiliser run-off causes algal bloom **ignore** detritivores
	a	ii	**any two from:** insecticide doesn't break down / persistent / not excreted (1) (increased concentration) becomes toxic / poisonous / causes cancer / liver damage (1)	2	**ignore** just 'bioaccumulation' **ignore** just 'kills them / harms them' **ignore** harm caused to whales' food supply
	b		chromosome ☐ generation ☐ pathogen ☐ plasmid ☐ transgenic ☑	1	more than 1 tick = 0 marks
	c		**restriction** / endonuclease (enzymes) - cut (open) (DNA) (1) **ligase** (enzymes) – join (up) (DNA) (1)	2	**ignore** removes genes / DNA **ignore** restrictive **allow** rejoins / seals (DNA) / sticks **ignore** simply 'pastes' / 'glues' unqualified **ignore** inserts gene / DNA
			Total	**7**	

Question			Expected Answers	Marks	Additional Guidance
11			**any two from:** antibiotics **only** destroy bacteria (and fungi) / antiseptics kill different types of micro-organisms (1) antibiotics usually swallowed or injected or used internally or taken as tablets / antiseptics applied to external body (1) antibiotics are made by microbes / antiseptics are man-made or made by plants (1) antibiotics treat existing infections / antiseptics can prevent infection (1)	2	assume unqualified answers refer to antibiotics **allow** antiseptics kill a wider range of microbes antiseptics are used on the skin to prevent infection = 2 **ignore** references to speed of action
			Total	**2**	

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