

Mark Scheme for June 2012

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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.















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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

Annotations

Annotation	Meaning
	Unclear
	Benefit of Doubt
	Cross
	Error carried forward
	Example / reference
	Ignore
	Not answered question
	Benefit of Doubt not given
	Large Dot (Key point attempted)
	Reject
	Contradiction
	Error in number of significant figures
	Tick
	Omission Mark

Highlighting is also available to highlight any particular points on the script.

The following questions should be annotated with ticks to show where marks have been awarded in the body of the text:

Abbreviations, annotations and conventions used in the detailed Mark Scheme.

/	=	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
<u> </u>	=	underlined words must be present in answer to score a mark
ecf	=	error carried forward
AW	=	alternative wording
ora	=	or reverse argument

Question		i	Mark	Guidance
1	(a)	Biodiversity;	1	
	(b)	Adapt to different conditions there (by natural selection); Unable to interbreed with organisms elsewhere / description of geographical isolation; The process(of evolution) requires a long period of time / organisms arrived on the island a long time ago;	3	ACCEPT example of different conditions. ACCEPT new conditions Description must refer to separation of populations / species owtte
	(c)	(i) Cut down trees (for fuel); Habitat destruction / nesting sites; harvesting flowers / cut down the trees which contain the flowers ; Removing food for birds; Bringing cats / dogs / rats / parrots etc; Kill the birds/eat the eggs / compete for food; Bring new diseases (from introduced species); (Birds die due to) lack of natural defences to fight; Hunting birds/ eggs (for food) / trade in exotic birds / feathers; Kills the birds / removes from area;	4	Effect must be clearly linked to cause for second mark Allow second marking point of pair even if 1 st is not awarded, if link is sensible Pairs of points need not be in separate numbered sections ACCEPT predators etc
		(ii) (Increased revenue from) tourism;	1	ACCEPT any reasonable suggestion
Total			9	

Question		Answer	Mark	Guidance
2	(a)	A. Rods + cones; B. Rods = all frequencies / low light levels; C. Cones = specific colours / frequencies; D. Red, blue and green;	4	ACCEPT wavelengths in place of frequencies IGNORE references to green light in context of rods ACCEPT "coloured light", examples of colours "Red, blue and green" scores marking points C and D
	(b)	Sun;	1	
	(c)	(i) Aerobic; Respiration;	2	
		(ii) A: mitochondria (is site of respiration); B: cytoplasm (is site of (some) respiration / glycolysis); C: Glucose + oxygen (reactants); D: carbon dioxide + water (products); E: ATP (product) OR ADP (reactant); 2 out of 3 from marking points C, D, E	2 2	
		(iii) Biosynthesis; Muscle contraction / nerve impulse; Active transport; Heat production ; any 2	2	ACCEPT any named biosynthetic reaction eg making proteins ACCEPT mitosis IGNORE growth, repair, movement NOT ATP production
Total			13	

Question			Answer	Mark	Guidance
3	(a)	(i)	(Light from) the flames / <u>reflected</u> sunlight; (Heat from) the fire / burning wood;	2	NOT flames alone for heat mark
		(ii)	(Infrared / Image B)– shows actual position of fire / shows hottest areas;	1	No mark for simply stating Image B/ infrared
	(b)		A. Sensors (in a satellite) detect radiation ; B. Create an electrical impulse; C. Convert to/ allocated a number (between 0 & 255); D. Depending on intensity (of radiation / impulse); E. Black = 0, white = high number AW Number determines brightness of pixel / shade of grey; F. Images made up of <u>pixels</u> / <u>pixel</u> represents certain area of land; Any 4	4	ACCEPT examples of radiation e.g. light / infra-red NEED link between number and grey shade for marking point E QWC if used the following words should be spelled correctly: Sensor Detect Convert Intensity Pixel
	(c)	(i)	Absorbed; By CO ₂ / H ₂ O <u>vapour</u> / N ₂ O / methane / greenhouse gas; OR Reflected / scattered; By water droplets (in clouds) / ice crystals (in clouds);	2	ACCEPT any named valid greenhouse gas ACCEPT dust etc
		(ii)	Correct rearrangement of equation AW $3.0 \times 10^8 / 2.0 \times 10^{13}$; 1.5×10^{-5} ; m;	3	NO ecf from incorrect rearrangement NOT 0.000015
	(d)	(i)	Longer than (wavelength of visible light); Shorter than (wavelength of thermal infrared);	1	
		(ii)	A. NIR reflected (well) by (healthy) vegetation; PLUS one from: B. monitors health or density of vegetation / area of rainforest / amount of deforestation / amount of logging; C. Can compare images over time;	2	
Total				15	

Question			Answer	Mark	Guidance
4	(a)	(i)	Organic matter that makes up living organisms;	1	ACCEPT dry mass of living material owtte
		(ii)	<i>Starting material:</i> Carbon dioxide + water; <i>Detail of photosynthesis:</i> Chloroplasts / chlorophyll / uses sunlight / light dependent stage; <i>Production of biomass:</i> Glucose → starch / more complex molecules / builds up more complex structures;	3	ACCEPT CO ₂ + H ₂ O QWC If used the words chloroplast/chlorophyll are spelled correctly Accept C ₆ H ₁₂ O ₆ for glucose Accept named molecules
	(b)		Carbon dioxide; From burning/combustion (of fossil fuel);	2	2 nd marking point does not depend on 1st
	(c)		Minerals / fertiliser / nitrates / nutrients ; Heat; Artificial light; Any 2	2	ACCEPT valid named nutrient NOT nitrogen alone Ignore water, air
	(d)		Used for food; Used for fuel; Can grow where conventional crops cannot / can be grown in seawater etc; Does not use up land areas / increases area for crop production; Would absorb CO ₂ from atmosphere / power stations; Reduce global warming; Any 5	5	Accept named examples eg sewage water NOT just grows in harsh condition Reduction of global warming must be linked to absorption of CO ₂
	(e)		Autotrophs;	1	IGNORE producers
			Total	14	

Question			Answer	Mark	Guidance
5	(a)	(i)	Bacteria / fungi;	1	ACCEPT decomposer, worms IGNORE name of specific type of bacteria
		(ii)	Description: any 2 marks A. Rises to its warmest to about 50°C at about 5 days; B. then steadies/ falls slightly; C. Large drop in temp once a day / at night / idea of <u>daily</u> fluctuation; Explanation: any 2 marks D. Heat given out by bacteria respiring ; E. Not so many bacteria to start with / reproducing fast at beginning / number of bacteria increasing; F. Stays steady as heat in equals heat out / number of bacteria remains constant after 5 day AW Slight fall after 6 days may be due to some bacteria dying; G. (Fall once a day at night) when outside temperature is lower; ORA	4	NEED one number (temperature or day number) to score first marking point
	(b)	(i)	Nitrogen + hydrogen → ammonia;	1	ACCEPT correctly balanced symbol equation
		(ii)	high pressure; (iron) catalyst;	2	ACCEPT pressure > 50 atm ALLOW high atmospheric pressure
		(iii)	(potassium) nitrate;	1	ACCEPT any suitable nitrate compound ACCEPT correct formula IGNORE incorrect formula if name also given IGNORE nitrogen
Total				9	

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

OCR Customer Contact Centre

Education and Learning

Telephone: 01223 553998

Facsimile: 01223 552627

Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

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

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