

Mark Scheme for January 2011

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.

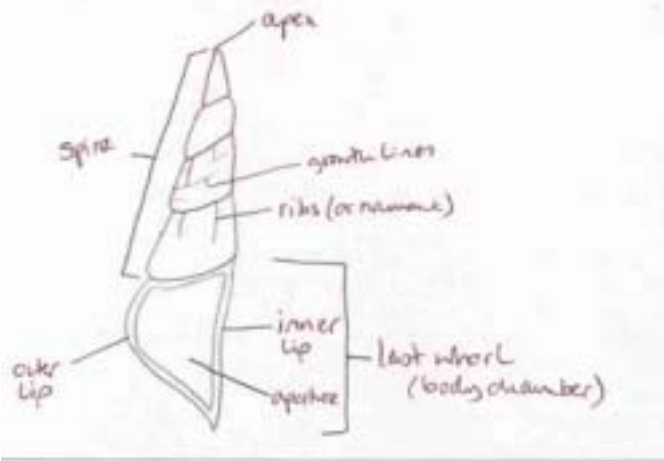
OCR will not enter into any discussion or correspondence in connection with this mark scheme.

© OCR 2011

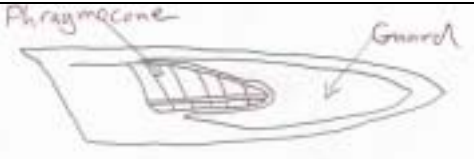
Any enquiries about publications should be addressed to:

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	Additional Guidance
1	a	i	A = ammonite, ceratite or goniatite B = crinoid C = gastropod D = graptolite or graptoloid	1 1 1 1	allow ammonoid do not allow sea lily do not allow dendroid
		ii	 <p>recognisable diagram</p> <p>2 correct labels from apex, spire, whorl, outer lip, inner lip, aperture, siphonal canal</p>	1 2	allow ecf from (i)
		iii	sessile or benthonic attached to the seafloor by roots or holdfast filter feeds or uses tube feet to catch food anal tube takes away waste	1 any 1	ecf from above part (i) for a maximum of one mark
		iv	D	1	ecf from above
	b	i	1 anus or periproct 2 interambulacra	1 1	

Question	Expected Answers	Marks	Additional Guidance
	ii 3. tube feet 4. pore or pore pair	1 1	
	iii respiration, used for gas exchange attachment or movement or clinging to rocks or substrate moving food particles towards the mouth	any 2	
	iv <u>movement</u> moves using spines that rotate or spines were attached to tubercle uses tube feet to move or to attach to rocks <u>feeding</u> scavenger uses jaws to feed or Aristotle's lantern grazes or scrapes algae off rocks	3	1 mark for movement 1 mark for feeding 1 mark for detail of <i>either</i> movement <i>or</i> feeding do not allow tube feet in detail
	Total	19	

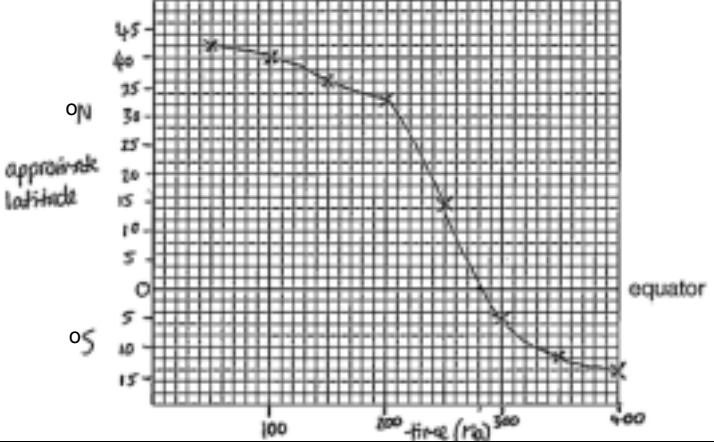
Question			Expected Answers	Marks	Additional Guidance
2	a	i	planktonic or pelagic free floating in surface layers of the ocean benthonic lives on the sea bed	any 1	must have a description and not just the term
		ii	ostracod = calcite or calcium carbonate or chitin conodont = apatite or calcium phosphate	1 1	do not accept calcite for fossil conodont
		iii	teeth for eating, feeding, rasping, grasping, slicing prey, jaw or in mouth of hagfish	1	
		iv	already extinct or at Permo – Triassic boundary	1	
	b	i	 recognisable diagram guard and phragmacone labelled correctly	1 1	
		ii	actively swimming or nektonic hunting or captures prey with tentacles uses jet propulsion to move around gas in chambers for buoyancy squirts ink to confuse prey tentacles for walking on sea floor	any 2	

Question	Expected Answers	Marks	Additional Guidance
	iii hard parts don't decay soft parts decay phragmacone is fragile and breaks guard is solid or made of calcite	any 1	
	c body fossil – solid remains of the skeleton or shell trace fossil – evidence of animals activity, burrow, footprint or dung (coprolite)	1 1	
	d atom by atom replacement of CaCO ₃ by FeS or pyrite environment rich in sulfur bacteria sulfur reduced to bisulfate bisulfate reacts with iron to form pyrites deep sea or anoxic environment	any 3	allow use of anaerobic and anoxic interchangeably
	e <i>diagenesis</i> early diagenesis means better preservation early replacement means better preservation change in acidity or dissolution or replacement of original material changes composition or replaces detail with more stable mineral eg clay temperature changes or pressure changes can alter preservation shape of the fossil can change <i>grain size of sediment</i> fine sediment fills in fine detail and preserves better or coarse does not large sediment allows increases porosity for movement of fluids or decreases preservation potential fine sediment better reflects shape and structure of fossil or detail preserved	any 2 any 2	stretch and challenge allow one mark for general statement about sediment type affecting preservation (shale and sandstone)
	Total	19	

Question			Expected Answers	Marks	Additional Guidance														
3	a	i	<table border="1"> <thead> <tr> <th>features</th> <th>options</th> </tr> </thead> <tbody> <tr> <td>composed of chitin or calcium carbonate</td> <td><input type="radio"/> true <input type="radio"/> false</td> </tr> <tr> <td>can grow up to 1 metre in diameter</td> <td><input type="radio"/> true <input checked="" type="radio"/> false</td> </tr> <tr> <td>consists of two different sized valves</td> <td><input checked="" type="radio"/> true <input type="radio"/> false</td> </tr> <tr> <td>has growth lines and ribbing</td> <td><input checked="" type="radio"/> true <input type="radio"/> false</td> </tr> <tr> <td>has two teeth within the hinge apparatus of the pedicle valve</td> <td><input checked="" type="radio"/> true <input type="radio"/> false</td> </tr> <tr> <td>has a lophophore used for attachment to rocks</td> <td><input type="radio"/> true <input checked="" type="radio"/> false</td> </tr> </tbody> </table>	features	options	composed of chitin or calcium carbonate	<input type="radio"/> true <input type="radio"/> false	can grow up to 1 metre in diameter	<input type="radio"/> true <input checked="" type="radio"/> false	consists of two different sized valves	<input checked="" type="radio"/> true <input type="radio"/> false	has growth lines and ribbing	<input checked="" type="radio"/> true <input type="radio"/> false	has two teeth within the hinge apparatus of the pedicle valve	<input checked="" type="radio"/> true <input type="radio"/> false	has a lophophore used for attachment to rocks	<input type="radio"/> true <input checked="" type="radio"/> false	4	all 6 correct = 4 marks 5 or 4 correct = 3 3 or 2 correct = 2 1 correct = 1
			features	options															
			composed of chitin or calcium carbonate	<input type="radio"/> true <input type="radio"/> false															
			can grow up to 1 metre in diameter	<input type="radio"/> true <input checked="" type="radio"/> false															
			consists of two different sized valves	<input checked="" type="radio"/> true <input type="radio"/> false															
			has growth lines and ribbing	<input checked="" type="radio"/> true <input type="radio"/> false															
			has two teeth within the hinge apparatus of the pedicle valve	<input checked="" type="radio"/> true <input type="radio"/> false															
has a lophophore used for attachment to rocks	<input type="radio"/> true <input checked="" type="radio"/> false																		
ii	<p>soft or muddy substrate flat valves or large resting area spreads out mass to stop sinking or increase surface area</p> <p>spines anchor valves spread out mass to stop sinking or increase surface area</p> <p>long hinge line or wide hinge line spread out mass to stop sinking or increase surface area</p> <p>margin of shell upturned out of sediment respiration allowed to continue whilst partially buried</p> <p>has small or no pedicle foramen or opening pedicle not needed or cannot attach to soft sediment</p>	4	adaptation must be clearly linked to the explanation																

Question	Expected Answers	Marks	Additional Guidance
	<p>fold and sulcus to keep sediment out of valves whilst feeding or respiring</p> <p>turbulent water large pedicle foramen or opening supports large pedicle for attachment to rocks or substrate</p> <p>living in groups or brachiopods nest many live together for protection / for attachment or cement to substrate</p> <p>thick, heavy or ribbed shells strength against wave action</p> <p>smooth or streamlined shells strength against wave action</p> <p>zigzag commissure reduces amount of sediment entering valve when it opens</p>	<p>any 2</p> <p>any 2</p>	
<p>b i</p>	<div data-bbox="392 893 795 1189" data-label="Diagram"> <p>A hand-drawn diagram of a bivalve shell cross-section. It shows a vertical, elongated shell with a central siphon extending upwards. Labels with lines pointing to specific parts include: 'Pallial sinus' at the top left, 'siphon' at the top center, 'Pallial line' on the right side, 'small adductor muscle scar' at the bottom left, and 'shell margin' at the top right.</p> </div> <p>recognisable diagram</p> <p>3 correct labels from pallial line, pallial sinus, two adductor muscle scars, dentition, umbo, shell margin or ligament</p>	<p>1</p> <p>3</p>	<p>e.g. <i>Solen</i> or <i>Mya</i></p> <p>Pallial sinus needs to be labelled at the same end as the siphon</p>

Question	Expected Answers	Marks	Additional Guidance
	<p>ii <i>feeding</i> extend <u>long</u> siphons to take in fresh water or inhalant siphons extract food particles from water or filter feeding</p> <p><i>respiring</i> extend long siphons to take in fresh water or inhalant siphons extract oxygen for respiration from water respiration occurs through gills or paired gills</p> <p>extend long siphons to eject waste water or exhalent siphons waste passed out through exhalent siphon</p>	<p>1</p> <p>1</p>	<p>1 mark for feeding with explanation 1 mark for respiring with explanation</p>
	<p>iii smooth shell, elongate shell or long thin shell to move through the sediment easily</p> <p>muscular foot or permanent gape never have to open shell for foot or siphons to protrude</p>	<p>1</p> <p>1</p>	<p>must have description of the adaptation stated for one mark</p>
<p>c</p>	<p>i brachiopods symmetrical along a median plane and bivalves symmetrical along hinge line</p>	<p>1</p>	<p>both type of symmetry either described or sketched for one mark</p>
	<p>ii bivalves - open their valves by relaxing adductor muscles or using ligament brachiopods - have two sets of muscles or diductor or one set of muscles contract to open valves</p>	<p>1</p> <p>1</p>	
	<p>Total</p>	<p>19</p>	

Question	Expected Answers	Marks	Additional Guidance
4 (a) i	<p>7 or 8 points plotted correctly = 2 marks 5 or 6 points plotted correctly = 1 mark curve of best fit = 1 mark</p> 	max 3	<p>4 or fewer points plotted correctly does not gain marks. Students can still gain one mark for doing a line of best fit based on their plotted marks.</p> <p>line may be a curve or simply join the dots plotted</p>
	ii 280Ma +/- 10 Ma	1	allow ecf if plotted incorrectly
	iii plates are not moving at the same rate or faster between 200 and 350Ma may move faster when plates break apart or continental rifting dependent on mantle convection or direction of movement may change sea floor spreading rate varies or collisions between continents slow it down	any 2	1 mark for stating that continental drift has varied
b i	coal requires rapid plant growth rapid plant or tree growth needs tropical conditions or high rainfall and tropical temperatures tropical conditions existed in the UK during the Carboniferous	any 2	1 mark for stating that coal only forms in equatorial areas

Question	Expected Answers	Marks	Additional Guidance
ii	desert sandstone dune bedded rocks wind blown or millet seed sand grains stained with haematite or evaporite deposits high evaporation needed barred basin structure	any 1	
iii	evidence for continental drift (eg jigsaw fit, fossils, lithology matches) evidence for palaeoclimate change in the UK (e.g. corals, relevant fossils, evaporites, tillites other lithologies) evidence in other parts of the world palaeomagnetic evidence detail about paleomagnetism, continental drift or palaeoclimate	any 2	
Total		11	

Question	Expected Answers	Marks	Additional Guidance
(b) i	<p>watery environment inside, white or albumin provides watery environment do not have to lay eggs in water or provides aquatic environment for development</p> <p>hard outer shell or thick outer layer protection against scavengers or desiccation</p> <p>porous shell allows O₂ in and CO₂ out or diffusion of gases for respiration</p> <p>yolk sac present provides food for developing embryo</p> <p>impermeable lining stops the egg drying out prior to hatching</p> <p>description and explanation in pairs for two marks</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>Max 4</p>	
	ii <u>beginning</u> of the Triassic / 251 Ma +/- 10Ma	1	
(c)	<p>footprints environment terrestrial tell us if sediment was soft or energy was low</p> <p>animal was bipedal or quadripedal size of the gait whether the animal was walking or running or how fast it was moving type of footprint or number and shape of claws or toes</p> <p>dung or coprolites likely to be land or shallow sea coprolites small, animals small or coprolites large, animals large environment can support large and small animals may contain evidence of specific types of plant or animal matter eg spores or pollen or bones</p>	<p>2</p>	<p>1 mark for environment 1 mark for mode of life</p> <p>1 mark for detail of environment or mode of life</p>
	Total	12	

Question	Expected Answers	Marks	Additional Guidance
6	extinction of land animals: e.g. dinosaurs, pterosaurs extinction of sea life: e.g. ammonites, belemnites, ichthyosaurs, some microfossils changes to land flora Causes and evidence for <u>1. Impact of comet or meteorite</u> high levels of Iridium in boundary clays shocked grains of quartz as evidence of high pressure tektites as evidence of impact melting wild fires or large scale fires sedimentary evidence for widespread tsunamis Chicxulub meteor crater, Yucatan peninsula, Mexico, large circular crater dust emissions due to impact enters the atmosphere climate cooling due to dust blocking sunlight reduction in photosynthesis or disruption of food chains <u>2. Large scale volcanicity</u> flood basalt activity dated at 65 Ma Deccan Traps of India or indicates size of around 700,000km ² wild fires or large scale fires release greenhouse gases or carbon dioxide causes an increase in temperature carbon dioxide reacts with water to form carbonic acid or sulfur dioxide reacts with water to form sulfuric acid sulfuric acid or carbonic acid causes acid rain contamination of fresh water supplies disruption of food chains on land (in particular) and in oceans changes to pH of oceans, acidification of oceans or affects shell formation climate cooling due to ash blocking out sunlight	1 1 1 Max 5 1 Max 5	

Question	Expected Answers	Marks	Additional Guidance
	<p data-bbox="320 245 1055 280"><u>3. Possible methane hydrates</u> (in sediments on sea bed)</p> <p data-bbox="320 316 952 416">warming of ocean water melts the solid methane methane is a very potent greenhouse gas green house gases cause rise in temperature</p>	<p data-bbox="1429 245 1442 280">1</p> <p data-bbox="1429 316 1442 344">1</p> <p data-bbox="1429 347 1442 376">1</p> <p data-bbox="1429 379 1442 408">1</p> <p data-bbox="1391 411 1480 446">Max 3</p>	
		10	

Question	Expected Answers	Marks	Additional Guidance
7	<p><u>similarities</u> both have tabulae both have a calice both have a soft bodied zooid in life both have skeletons made of calcite or corallum both lived in the same environment both are now extinct</p> <p><u>differences</u> tabulate – no dissepiments or sometimes reduced rugose – dissepiments often present</p> <p>tabulate - radial symmetry rugose – bilateral symmetry</p> <p>tabulate – ranges Cambrian to Permian rugose – ranges Ordovician to Permian</p> <p>tabulate - no axial complex or columella rugose – always has axial complex or columella</p> <p>tabulate – septa sometimes, reduced or poorly developed or none rugose – present or well developed</p> <p>tabulate – always colonial rugose – colonial or solitary</p> <p>tabulate – small corallites or mainly round or oval rugose – larger corallites or often polygonal or hexagonal</p> <p>tabulate common in the Silurian rugose common in the Carboniferous</p>	<p>1 1 1 1 1 1 Max 3</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>accept both range from Ordovician to Permian</p> <p>need both tabulate and rugose discussed for one mark</p>

Question	Expected Answers	Marks	Additional Guidance
	tabulate not attached or cemented to the sea floor rugose were attached or cemented to the sea floor tabulate have mural pores rugose lack mural pores Suitable diagram of <u>tabulate</u> form with at least two labels Suitable diagram of <u>rugose</u> form with at least two labels	1 1 Max 7 1 1 Max 2	Max 8 if no diagrams are used Mark annotated diagrams as text
		10	

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

© OCR 2011

