

Characteristics and Classification of Living Organisms

Mark Scheme 3

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Characteristics and Classification of Living Organisms
Sub-Topic	
Paper Type	Alternative to Practical
Booklet	Mark Scheme 3

Time Allowed: 59 minutes

Score: /49

Percentage: /100

Question	Mark Scheme	Mark allocation	Guidance
1 (a) (i)	<p>Drawing: S: size greater than original; O: outline shape to show proportions of feather A; D: one correct detail; Label: one from rachis / calamus / after feathers / vane / shaft / quill / umbilicus / barb;</p>	[4]	<p>Award max 3 for drawing and max 1 for labels If feather B drawn, accept S [> 82 mm] only for drawing and accept correct label, max 2</p> <p>Accept evidence of smooth surface top left / middle region / smoother base / two projections lower right / rachis</p> <p>Accept attachment to body / filaments</p>
(ii)	insulation / trap (body) warmth / prevents loss of (body) warmth / traps air / protection against cold / AVP;	[1]	<p>Ignore warm / heat the bird Ignore protect alone Ignore camouflage / attraction / breeding / cover</p>
(iii)	flight; blade like / rigid / stiff / wind or air resistance / air will not pass through / aerodynamic / AW;	[2]	<p>Accept glide Ignore feathers packed together Ignore increase surface area Less wind / air resistance loses second marking point.</p>
(b) (i)	<p>correct area / $12.5 \text{ cm}^2 (\pm 1 \text{ cm}^2)$; evidence that 1 square = 1 cm^2; marks on feather or grid to show it was used to calculate the area of feather;</p> <p>reference to number of whole and part squares in the working;</p> <p>double calculated area to give total surface area;</p>	[max 3]	<p>Accept $25 \text{ cm}^2 (\pm 1 \text{ cm}^2)$ if they have doubled the area Accept statement or correct use in calculation or on grid</p>

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(ii)	<p>Divide feather into (geometric) shapes; measure and add together areas of each shape; OR Cut out shape of feather in paper and weigh mass; cut out known area of paper and weigh mass; calculate area of paper; OR Cut feather into small pieces; fit into 1 cm² squares; OR Use grid with smaller squares; count squares covered by feather / AW;</p> <p>Double calculated area to give total surface area;</p>	<p>[max 2] [Total: 12]</p>	<p>Ignore smaller grid unqualified</p> <p>This mark can be awarded with any other mark</p>

<p>2 (a)</p>	<p>Drawing: O: clear outline, drawing same size or larger than photograph; P: reasonable proportions of parts of leg;</p> <p>D: detail mark e.g. hairs / detail of segments at the end / claws / presence of segment attached to abdomen;</p> <p>Labels: any 2 from joint / segment / jointed legs; hairs; claw;</p>	<p>[max 5]</p>	<p>R. sketchy outline / incomplete outline (take account of scanning) / shading A. three parts, largest at the top, medium then smallest en part I. individual segments on end part I. segment of leg attached to abdomen R. parallel sided segment</p> <p>A. articulatio A. hook I. fu I. pointed end</p>
<p>(b) (i)</p>	<p>20 +/- 1 (mm);</p>	<p>[1]</p>	
<p>(ii)</p>	<p>working: <u>measurement from (i)</u> ; 500 0.04 (mm);</p>	<p>[2]</p>	<p>A. correct diameter = 2 marks A. 0.038 – 0.042mm Allow e.c.f A. 4×10^{-2}</p>

<p>(c)</p>	<p>Any four from safety feature e.g. goggles / tongs / lab. coat / water bath;</p> <p><u>Starch</u> iodine solution;</p> <p>colour change expected – (brown) to blue / black (if present) ;</p> <p><u>Reducing sugar</u> Benedict’s solution / correct chemicals / Clinistix; heat; colour change expected;</p>	<p>[max 4]</p>	<p>I. glove</p> <p>I. iodin A. drops of iodin I. reference to boiling for starch tes</p> <p>Benedict’s – green / orange / brick red (if present) Clinistix – (pink -) purple (if present) For each test do not award expected colour change if incorrect reagent. N.B. Colour changes must be correctly linked to starch or reducing sugar</p>
<p>(d) (i)</p>	<p>it is a pest / causes harm / AW;</p> <p>lives on (adult) bees / (their) larvae; sucks / blood /AW; AVP;</p>	<p>[2]</p>	<p>I. ‘affects’ organism if unqualifie A. correct reference to harm within a general definition of a parasite</p>
<p>(ii)</p>	<p>Mark independently :</p> <p><i>honey bee</i> – insecta; <i>feature</i> – wings / 3 pairs or 6 legs / 3 body parts or head + thorax + abdomen / 1 pair of antennae / (1 pair of) compound eyes;</p> <p><i>parasite</i> – arachnida; <i>feature</i> – 4 pairs of legs;</p>	<p>[4]</p>	<p>A. insect / insectoid I. features common to arthropods e.g. jointed limbs</p> <p>A. arachnid / arachnoi I. spide I. 4 or more pairs of legs I. negative feature I. incorrect feature</p>
<p>[Total: 18]</p>			

- 3 (a) (i) Drawing of pod:
S larger size than Fig.1.2, ;
P accurate proportion;
O clear outline;
- Label: pod (fruit);
nut (seed);
stalk (flowering);
- [max: 5]
- (ii) length of drawing mm / cm
and length of Fig.1.2 mm / cm;
magnification x.....; [3]
- (b) rise in temperature 50°C [1]
- (ii) 50 x 20 x 4.2 / 0.5 x 1000 ;
8 or 8.4 kJ g⁻¹ ; [2]
- (iii) graph B bar chart;
A axes labelled and units;
C columns – ruled + gaps between columns;
P plot completely accurate; [4]
- (vi) fat; [1]
- (c) grind in water;
add Benedicts solution(s);
heat;
colour change; [max: 3]

[total: 19]