

# Mark Scheme November 2007

IGCSE

## IGCSE Biology (4325)

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November 2007

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## BIOLOGY 4325, November 2007, MARK SCHEME

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### Key

- ; indicates separate mark points  
 / indicates alternatives  
 eq allow for correct equivalent  
 — word underlined means no alternatives allowed

### Paper 1F

Question Number	Question		
1			
	Acceptable Answers	Reject	Mark
	(a) A/ flower;		1
	(b) D/ photosynthesis;		1
	(c) A;		1
	(d) C/ 3;		1
	(e) B/ <i>Mucor</i> ;		1
	(f) D/ tissue cell organ system;		1
	(g) C/23;		1
	(h) B/ the small intestine;		1
	(i) D/ decomposition;		1
	(j) A/ XY and XX;		1
			(10)

Total 10 marks

Question Number	Question		
2	(a)		
	Acceptable Answers	Reject	Mark
	Two from: nitrate; phosphate; potassium; or other named mineral ion;		(2)

Question Number	Question		
2	(b)		
	Acceptable Answers	Reject	Mark
	(i) manure / faeces / urine / sewage;		1
	(ii) two from: cheaper; easier to obtain / readily available; improves soil structure; less harm to the environment / less pollution / recycled; slow release / retained longer in the soil / eq;		2
			(3)

Total 5 marks

Question Number	Question		
3	(a)		
	Acceptable Answers	Reject	Mark
	(i) respiration; photosynthesis; feeding;		3
	(ii) oxygen / O <sub>2</sub> ;		1
			(4)

Question Number	Question		
3	(b)		
	Acceptable Answers	Reject	Mark
	(i) oil / coal / gas / petrol;		1
	(ii) more carbon dioxide released; greenhouse gas / greenhouse effect; increases global warming / increases air temperature; melting of ice caps; flooding; habitat destruction / eq;		3
			(4)

Total 8 marks

Question Number	Question		
4	(a)		
	Acceptable Answers	Reject	Mark
	A = renal artery; B = renal vein; C = ureter;		(3)

Question Number	Question		
4	(b)		
	Acceptable Answers	Reject	Mark
	urine / urea / salts;		(1)

Question Number	Question		
4	(c)		
	Acceptable Answers	Reject	Mark
	(i) Two from: increases / eq.; less ADH; lots of water in the blood; less water reabsorbed;		2
	(ii) Two from: decreases / eq.; more ADH; less water in blood; sweating;		2
			(4)

Total 8 marks

Question Number	Question		
5	(a)		
	Acceptable Answers	Reject	Mark
	Three from: receptor and effector stimulus response ;;;		(3)

Question Number	Question																	
5	(b)																	
	Acceptable Answers		Mark															
	<table border="1"> <thead> <tr> <th>Description</th> <th>Hormones</th> <th>Nerves</th> </tr> </thead> <tbody> <tr> <td>Response is fast</td> <td>Yes</td> <td>No</td> </tr> <tr> <td>Response lasts a long time</td> <td>Yes</td> <td>No</td> </tr> <tr> <td>Are specialised cells</td> <td>No</td> <td>Yes</td> </tr> <tr> <td>Are carried in blood stream</td> <td>Yes</td> <td>No</td> </tr> </tbody> </table>	Description	Hormones	Nerves	Response is fast	Yes	No	Response lasts a long time	Yes	No	Are specialised cells	No	Yes	Are carried in blood stream	Yes	No		(3)
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Response is fast	Yes	No																
Response lasts a long time	Yes	No																
Are specialised cells	No	Yes																
Are carried in blood stream	Yes	No																

Question Number	Question		
5	(c)		
	Acceptable Answers	Reject	Mark
	adrenaline / insulin / testosterone / progesterone / oestrogen; adrenal glands / pancreas / testes / ovaries; increase heart rate ;		(3)

Question Number	Question		
5	(d)		
	Acceptable Answers	Reject	Mark
	Two from: grow; towards light / positive; phototropism; auxin;		(2)

Total 11 marks

Question Number	Question		
6	(a)		
	Acceptable Answers	Reject	Mark
	Three from: kill; pests / insects / organisms; less damage / less crop eaten; better yield / eq;		(3)

Question Number	Question		
6	(b)		
	Acceptable Answers	Reject	Mark
	(i) suitable example; target organism;		2
	(ii) Two from: specific / does not affect other organisms / eq.; does not need to be reapplied; does not pollute / not poisonous;		2
			(4)

Question Number	Question		
6	(c)		
	Acceptable Answers	Reject	Mark
	resistance to pests / eq.;		(1)

Total 8 marks

Question Number	Question													
7														
	Acceptable Answers	Mark												
	<table border="1"> <thead> <tr> <th>Process</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td>removing waste products (of metabolism)/eq;</td> </tr> <tr> <td>growing;</td> <td></td> </tr> <tr> <td>respiring;</td> <td></td> </tr> <tr> <td></td> <td>producing young /eq;</td> </tr> </tbody> </table>	Process	Description				removing waste products (of metabolism)/eq;	growing;		respiring;			producing young /eq;	(4)
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	removing waste products (of metabolism)/eq;													
growing;														
respiring;														
	producing young /eq;													

Total 4 marks



Question Number	Question		
<b>8</b>	<b>(a)</b>		
	Acceptable Answers	Reject	Mark
	C; B; A;		<b>(3)</b>

Question Number	Question		
<b>8</b>	<b>(b)</b>		
	Acceptable Answers	Reject	Mark
	(i) alveoli; capillaries / blood;		2
	(ii) water; capillaries / blood;		2
	(iii) soil / soil water; cytoplasm;		2
			<b>(6)</b>

Question Number	Question		
<b>8</b>	<b>(c)</b>		
	Acceptable Answers	Reject	Mark
	(i) C;		1
	(ii) B;		1
			<b>(2)</b>

**Total 11 marks**

Question Number	Question		
<b>9</b>	<b>(a)</b>		
	Acceptable Answers	Reject	Mark
	(i) periwinkle / (bank) vole;		1
	(ii) sun / light;		1
			<b>(2)</b>

Question Number	Question		
<b>9</b>	<b>(b)</b>		
	Acceptable Answers	Reject	Mark
	4 links / eq, e.g. longer/more organisms/more consumers/ref tertiary consumer; they do not start with a producer / start with dead organisms;		<b>(2)</b>
Question Number	Question		
<b>9</b>	<b>(c)</b>		
	Acceptable Answers	Reject	Mark
	<b>(i)</b> bacteria; fungi;		2
	<b>(ii)</b> rot / decay / digest / breakdown; dead organisms; release carbon dioxide; respiration; carbon dioxide absorbed by plants / used in photosynthesis;		3
			<b>(5)</b>

**Total 9 marks**

Question Number	Question		
<b>10</b>	<b>(a)</b>		
	Acceptable Answers	Reject	Mark
	lens;		<b>(1)</b>
Question Number	Question		
<b>10</b>	<b>(b)</b>		
	Acceptable Answers	Reject	Mark
	<b>(i)</b> light does not pass through easily / is scattered/eq; not focussed / not on retina / eq.;		2
	<b>(ii)</b> Nn and nn; N n and n n; Nn Nn nn nn; cloudy clear;		4
			<b>(6)</b>

**Total 7 marks**

Question Number	Question	
11	(a)	
	Acceptable Answers	Mark
	A nucleus; genetic material/control cell activities; B cytoplasm; chemical reactions/metabolism/respiration/eq; C cell membrane; controls entry and exit of substances from cell;	(6)

Question Number	Question	
11	(b)	
	Acceptable Answers	Reject Mark
	digested / killed / destroyed / eq; enzymes / named enzyme;	(2)

Question Number	Question	
11	(c)	
	Acceptable Answers	Reject Mark
	50%; (one mark for 3500 in working)	(2)

Total 10 marks

Question Number	Question															
12																
	Acceptable Answers	Mark														
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Step	Order of step															
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select early flowering plants	(1)															
grow early flowering offspring plants	(5)															
repeat the process for several generations	6;															
collect seeds from early-flowering plants	2;															

Total 4 marks

Question Number	Question		
13			
	Acceptable Answers	Reject	Mark
	<b>Five from:</b> increase yield; (control / increased) temperature / use of heating (during cold months); (control / increased) light / extra light (in dark months); (control / increased) carbon dioxide; fewer pests / easier control of pests; less wind; less pollution; long wavelength reflected; enzymes; (more) photosynthesis;		(5)

Total 5 marks

Total for the paper 100 marks

**Paper 2H**

Question Number	Question													
<b>1</b>														
	Acceptable Answers	Mark												
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	removing waste products (of metabolism)/eq;													
growing;														
respiring;														
	producing young /eq;													

**Total 4 marks**

Question Number	Question	
<b>2</b>	<b>(a)</b>	
	Acceptable Answers	Reject Mark
	C; B; A;	(3)

Question Number	Question	
<b>2</b>	<b>(b)</b>	
	Acceptable Answers	Reject Mark
	<b>(i)</b> alveoli; capillaries / blood;	2
	<b>(ii)</b> water; capillaries / blood;	2
	<b>(iii)</b> soil / soil water; cytoplasm;	2
		<b>(6)</b>

Question Number	Question	
<b>2</b>	<b>(c)</b>	
	Acceptable Answers	Reject Mark
	<b>(i)</b> C;	1
	<b>(ii)</b> B;	1
		<b>(2)</b>

**Total 11 marks**

Question Number	Question		
<b>3</b>	<b>(a)</b>		
	Acceptable Answers	Reject	Mark
	(i) periwinkle/ (bank) vole;		1
	(ii) sun / light;		1
			<b>(2)</b>

Question Number	Question		
<b>3</b>	<b>(b)</b>		
	Acceptable Answers	Reject	Mark
	4 links / eq, e.g. longer/more organisms/more consumers/ref tertiary consumer; they do not start with a producer / start with dead organisms;		<b>(2)</b>

Question Number	Question		
<b>3</b>	<b>(c)</b>		
	Acceptable Answers	Reject	Mark
	(i) bacteria; fungi;		2
	(ii) rot / decay / digest / breakdown; dead organisms; release carbon dioxide; respiration; carbon dioxide absorbed by plants / used in photosynthesis;		3
			<b>(5)</b>

**Total 9 marks**

Question Number	Question		
<b>4</b>	<b>(a)</b>		
	Acceptable Answers	Reject	Mark
	lens;		<b>(1)</b>

Question Number	Question		
4	(b)		
	Acceptable Answers	Reject	Mark
	(i) light doesn't pass through easily / is scattered / eq; not focussed / not on retina / eq.;		2
	(ii) Nn and nn; N n and n n; Nn Nn nn nn; cloudy clear;		4
			<b>(6)</b>

Total 7 marks

Question Number	Question		
5	(a)		
	Acceptable Answers		Mark
	A nucleus; genetic material/control cell activities; B cytoplasm; chemical reactions/metabolism/respiration/eq; C cell membrane; controls entry and exit of substances from cell;		
			<b>(6)</b>

Question Number	Question		
5	(b)		
	Acceptable Answers	Reject	Mark
	digested / killed / destroyed / eq; enzymes / named enzyme;		
			<b>(2)</b>

Question Number	Question		
5	(c)		
	Acceptable Answers	Reject	Mark
	50%; (one mark for 3500 in working)		
			<b>(2)</b>

Total 10 marks

Question Number	Question															
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collect seeds from early-flowering plants	2;															

Total 4 marks

Question Number	Question	
7		
	Acceptable Answers	Reject Mark
	<p><b>Five from:</b>            increase yield;            (control / increased) temperature / use of heating (during cold months);            (control / increased) light / extra light (in dark months);            (control / increased) carbon dioxide;            fewer pests / easier control of pests;            less wind;            less pollution;            long wavelength reflected;            enzymes;            (more) photosynthesis;</p>	(5)

Total 5 marks

Question Number	Question	
8	(a)	
	Acceptable Answers	Reject Mark
	<p>simple sugars / glucose;            amino acids / peptides;            lipids / fats;</p>	(3)



Question Number	Question		
<b>8</b>	<b>(b)</b>		
	Acceptable Answers	Reject	Mark
	Peak / up and down; 40°C;		<b>(2)</b>

**Total 5 marks**

Question Number	Question		
<b>9</b>	<b>(a)</b>		
	Acceptable Answers	Reject	Mark
	letter L to anywhere on the large intestine;		<b>(1)</b>

Question Number	Question		
<b>9</b>	<b>(b)</b>		
	Acceptable Answers	Reject	Mark
	letter B to the liver;		<b>(1)</b>

Question Number	Question		
<b>9</b>	<b>(c)</b>		
	Acceptable Answers	Reject	Mark
	raises pH / neutralises acid; emulsification of lipids / eq;		<b>(2)</b>

Question Number	Question		
<b>9</b>	<b>(d)</b>		
	Acceptable Answers	Reject	Mark
	Two from: capillaries; lacteals; large surface area; thin walls / short distance;		<b>(2)</b>

**Total 6 marks**

Question Number	Question		
<b>10</b>	<b>(a)</b>		
	Acceptable Answers	Reject	Mark
	(i) A Bowman's capsule / renal capsule; B (proximal) convoluted tubule; C collecting duct;		3
	(ii) movement of small molecules (from the blood into the kidney); (under) pressure;		2
			<b>(5)</b>

Question Number	Question		
<b>10</b>	<b>(b)</b>		
	Acceptable Answers	Reject	Mark
	(i) 66 / 66.6 / 66.7;		1
	(ii) less water / water reabsorbed;		1
			<b>(2)</b>

Question Number	Question		
<b>10</b>	<b>(c)</b>		
	Acceptable Answers	Reject	Mark
	Three from: pituitary; less ADH / eq; collecting ducts less permeable; less water reabsorbed (into blood);		<b>(3)</b>

**Total 10 marks**

Question Number	Question		
<b>11</b>	<b>(a)</b>		
	Acceptable Answers	Reject	Mark
	dotted line remains high after the peak;		<b>(1)</b>

Question Number	Question		
<b>11</b>	<b>(b)</b>		
	Acceptable Answers	Reject	Mark
	zygote; embryo; amniotic;		<b>(3)</b>

Question Number	Question		
11	(c)		
	Acceptable Answers	Reject	Mark
	sexual;		(1)

Total 5 marks

Question Number	Question		
12	(a)		
	Acceptable Answers	Reject	Mark
	respiration;		(1)

Question Number	Question		
12	(b)		
	Acceptable Answers	Reject	Mark
	O <sub>2</sub> and H <sub>2</sub> O on left and right respectively; 6 on both sides; Allow one mark for oxygen and water if no other marks gained		(2)

Question Number	Question		
12	(c)		
	Acceptable Answers	Reject	Mark
	Two from: lose heat; maintain body temp; need to generate/replace heat / eq;		(2)

Question Number	Question		
12	(d)		
	Acceptable Answers	Reject	Mark
	Two from narrowing of blood vessels (at skin surface); vasoconstriction; takes blood away from the skin; to conserve heat; decreased sweating;		(2)

Total 7 marks

Question Number	Question		
<b>13</b>	<b>(a)</b>		
	Acceptable Answers	Reject	Mark
	B or C; D; E;		<b>(3)</b>

Question Number	Question		
<b>13</b>	<b>(b)</b>		
	Acceptable Answers	Reject	Mark
	secrete enzymes; external digestion / on to food; product absorbed;		<b>(2)</b>

Question Number	Question		
<b>13</b>	<b>(c)</b>		
	Acceptable Answers	Reject	Mark
	leaching / run off / idea of fertiliser getting into river; increase in algal growth; amino acids / proteins; eutrophication;  <b>Notes</b>		<b>(4)</b>

**Total 9 marks**

Question Number	Question		
<b>14</b>	<b>(a)</b>		
	Acceptable Answers	Reject	Mark
	genetically; identical;		<b>(2)</b>

Question Number	Question		
<b>14</b>	<b>(b)</b>		
	Acceptable Answers	Reject	Mark
	Adv: all have / lots have good characteristics/features; Disadv: more susceptible to disease;		<b>(2)</b>

Question Number	Question		
<b>14</b>	<b>(c)</b>		
	Acceptable Answers	Reject	Mark
	(i) new genes / DNA added; from other species;		2
	(ii) e.g. 1. pigs given human insulin gene; to produce human insulin; e.g. 2. sheep / cows produce milk; with proteins to treat cystic fibrosis; e.g. 3. host animal e.g. pig grows human organs; for use in transplantation;		4
			<b>(6)</b>

**Total 10 marks**

Question Number	Question		
<b>15</b>	<b>(a)</b>		
	Acceptable Answers	Reject	Mark
	(i) label A to left atrium;		1
	(ii) two from: wall is being squeezed/space inside ventricle is small; atrioventricular closed; semilunar valve is open; blood is leaving the ventricle / heart;		2
	(iii) pulmonary vein;		1
			<b>(4)</b>

Question Number	Question		
<b>15</b>	<b>(b)</b>		
	Acceptable Answers	Reject	Mark
	(i) 0.2 seconds;		1
	(ii) between 0.2 and 0.4 seconds;		1
	(iii) 0.3 seconds; highest pressure (in the left ventricle) / 17.3 higher than 16.0; forcing blood through semi-lunar valves and into the aorta;		3
			<b>(5)</b>

**Total 9 marks**

Question Number	Question		
<b>16</b>	<b>(a)</b>		
	Acceptable Answers	Reject	Mark
	<b>Three</b> from: exercise more difficult; blockage (to air passages); idea of less oxygen / less gas exchange / less diffusion; into blood / capillaries; idea of less respiration;		<b>(3)</b>

Question Number	Question		
<b>16</b>	<b>(b)</b>		
	Acceptable Answers	Reject	Mark
	gene / DNA cut; restriction / endonuclease; plasmid / phage / virus; recombinant; vector; inhaled / aerosol; sticky ends; ligase;		<b>(6)</b>

**Total 9 marks**  
**Total marks for paper 120**

Paper 03

Question Number	Question	
1	(a)	
	Acceptable Answers	Mark
	(i) B = beaker; D = tripod; E = Bunsen burner / eq; Ignore stand	3
	(ii) heatproof mat / safety glasses/gloves/ adjust / visible flame / keep hands away from could burn / eq; tongs / hot milk / could scald / place on centre of bench/eq; glass / could break / could cut / eq;	2 max
	<b>Notes</b> (ii) max 2	(4)

Question Number	Question	
1	(b)	
	Acceptable Answers	Mark
	(i) Q;	1
	(ii) fridge / ice bucket / ice trough / eq;	1
	<b>Notes</b>	(2)

Total 6 marks

Question Number	Question	
2	(a)	
	Acceptable Answers	Reject
	6.2; 6.0; 6.0; 5.8;	
	<b>Notes</b>	(4)

Question Number	Question	
2	(b)	
	Acceptable Answers	Reject
	(i) ice; IGN fridge	1
	(ii) kill / cruel / unethical / cause harm / eq; Ignore denatured	1
	<b>Notes</b>	(2)

Question Number	Question		
2	(c)		
	Acceptable Answers	Reject	Mark
	S - scale linear + at least 50% of axis; L - through points and labelled; A - axes correct and labelled UNITS; P - points plotted correctly;;  Notes		(5)

Total 11 marks

Question Number	Question		
3	(a)		
	Acceptable Answers	Reject	Mark
	(i) measuring cylinder / syringe / pipette / burette;		1
	(ii) 1 260;; (one for 15 x 20).		2
	(iii) 6 300; allow TE (ii) x 5;		1
	Notes		(4)

Question Number	Question		
3	(b)		
	Acceptable Answers	Reject	Mark
	(i) 8560;		1
	(ii) into air / atmosphere / surroundings / eq.; needle; into glass / tube; too slow moving / too far away;		2 max
	Notes (ii) max 2		(3)



Question Number	Question		
3	(c)		
	Acceptable Answers	Reject	Mark
	beaker has lower surface area : volume ratio / tube has higher surface area ; volume ratio; less heat loss / less temperature fall / boiling tube cools down quicker; larger surface area to absorb heat;  <b>Notes</b>		(2 max)

Total 9 marks

Question Number	Question		
4	(a)		
	Acceptable Answers	Reject	Mark
	(i) 36;  (ii) 51 / 3 <sup>rd</sup> result at 25 °C with vitamin C; not given long enough to warm up to 25 °C; not enough Vit C / not enough yeast;  (iii) 35 °C; with vitamin C;  <b>Notes</b>		1   2 max  2  <b>(5)</b>

Question Number	Question		
4	(b)		
	Acceptable Answers	Reject	Mark
	(i) low kinetic energy/ eq; high temp + denatured / destroyed; optimum / best / ideal / eq; ref to gas / carbon dioxide bubbles / eq;  (ii) more rise / faster rise; no difference at lowest / 15 and/ or highest / 65 / at some temperatures;  <b>Notes</b>		3   2  <b>(5)</b>

Total 10 marks

Question Number	Question		
5	(a)		
	Acceptable Answers	Reject	Mark
	reliable to 3 <sup>rd</sup> meaning box; precise to 2 <sup>nd</sup> meaning box; valid to 1 <sup>st</sup> meaning box;  <b>Notes</b>		(3)

Question Number	Question		
5	(b)		
	Acceptable Answers	Reject	Mark
	volume of bubbles / vary in size; easy to miscount/eq; composition of bubbles / not all oxygen / some CO <sub>2</sub> ; allow oxygen dissolves in water/eq;  <b>Notes</b> Max 2		2 max  (2)

Total 5 marks

Question Number	Question		
6	(a)		
	Acceptable Answers	Reject	Mark
	random placing; use more quadrats; calculate % cover / eq;  <b>Notes</b> Max 2		2 max  (2)

Question Number	Question		
<b>6</b>	<b>(b)</b>		
	<b>Acceptable Answers</b>	<b>Reject</b>	<b>Mark</b>
	C - +/- light / range of light intensities; O - same species/age / size of plant / eq; R - several plants used; M1 - growth measured in mass/height/ length; M2 - time period mentioned; S1 - named condition controlled; eg temperature S2 - named condition controlled; eg carbon dioxide  <b>Notes</b> Max 6		6 max  <b>(6)</b>

Total 8 marks

Total marks for paper 50

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