

# IGCSE BIOLOGY 4325, NOVEMBER 2005 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

1. (a) C; (1)  
(b) A; (1)  
(c) A; (1)  
(d) D; (1)  
(e) D; (1)  
(f) C; (1)  
(g) A; (1)  
(h) B; (1)  
(i) C; (1)  
(j) B; (1)

Total 10 marks

2. (a) six; (1)  
(b) glucose;  
amino acids;  
fatty acids; max  
glycerol; (2)  
(c) A - cell membrane;  
B - cytoplasm;  
C - nucleus; (3)

Total 6 marks

3. (a) 

Name of cell	Number of chromosomes in cell
neurone	(46)
sperm	23;
red blood cell	0;
skin	46;

 (3)  
(b) (i) testis; (1)  
(ii) eg; (1)

Total 5 marks

4. (a)	Sentence	Number	
	The number of organisms is	(5)	
	The number of producers is	2;	
	The number of animals is	3;	
	The number of food chains is	4;	(3)

- (b) (i) decrease / eq; (1)  
(ii) increase / eq; (1)

**Total 5 marks**

5. (a) (i) 16; (1)  
(ii) 800 million; (1)  
(iii) 100;  
million; (2)  
(iv) on steep line; (1)  
(v) build up of waste / eq;  
lack of food / eq; (2)
- (b) insulin; (1)

**Total 8 marks**

6. (a) (i) all points correctly plotted;;  
lose 1 mark per error (1)  
(ii) increases / eq; (1)  
(iii) 40; (1)
- (b) artery ticked; (1)
- (c) lung; (1)

**Total 6 marks**

7. (a) optic nerve; (1)
- (b) (i) cornea; (1)  
(ii) reduce ability / eq;  
less bending / less transmission; (2)

**Total 4 marks**

8. pesticides;  
 increases;  
 carnivores;  
 biological;  
 harm;  
 chains; (6)

Total 6 marks

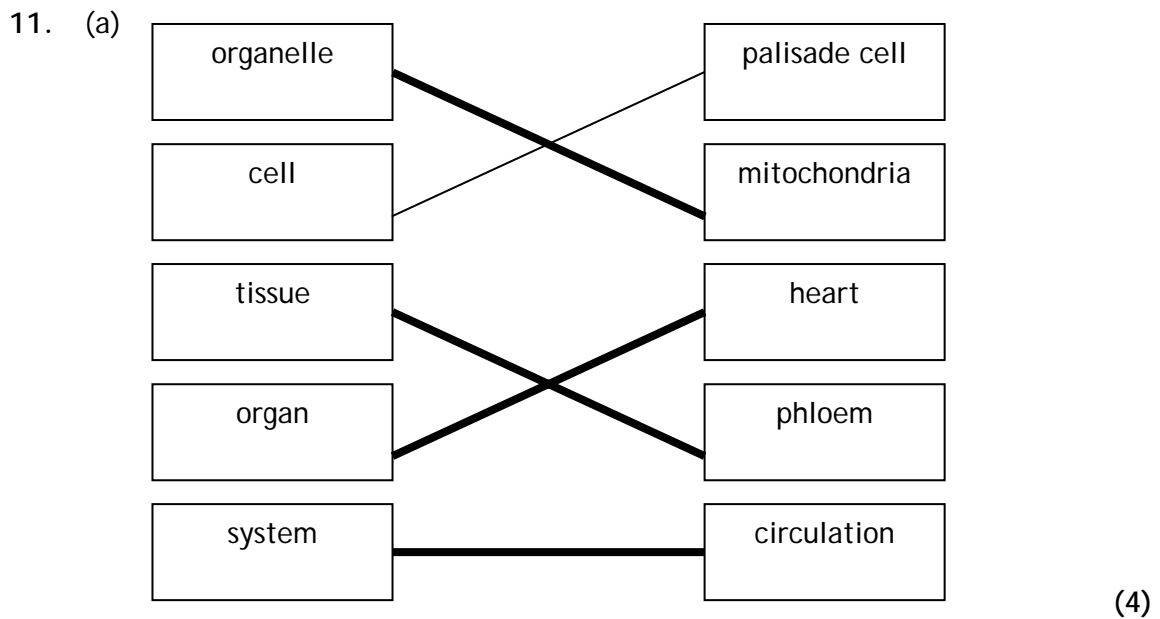
9.

		human / eq;	
	single celled; lack nucleus;	<i>Lactobacillus</i> / eq;	
virus;			(5)

Total 5 marks

10. parent male XY and parent female XX;  
 male gametes X and Y and female gametes X and X;  
 offspring genotype XY, XY, XX, XX or each may be given once;  
 male/boy, male/boy, female/girl, female/girl or each may be given once; (4)

Total 4 marks



- (b) organelle; (1)

Total 5 marks

12. (a) (i) Nn; (1)  
(ii) nn circled; (1)  
(iii) two; (1)
- (b) (i) pancreatic duct blocked / no enzymes from pancreas / eq; (1)  
(ii) amylase / maltase / carbohydrase;  
protease / trypsin / pepsin;  
lipase; (3)  
(iii) enzymes/named enzyme are proteins;  
digested / broken down;  
by stomach enzyme/protease/pepsin; max  
acid / HCl / incorrect pH; (2)

Total 9 marks

13. increase in temperature;  
rate of reaction / rate of enzyme controlled reaction increases / eq;  
increased carbon dioxide conc.;  
for photosynthesis;  
increased nitrates;  
used for amino acid / protein synthesis / ;  
for new cell growth;  
increase in one other named mineral eg magnesium / eq; max  
use of named mineral eg chlorophyll / eq; (6)

Total 6 marks

14. (a) brain;  
spinal cord; (2)

(b)

fast	slow;
neurones / nerves;	blood/ blood vessel;
short	long;
electrical;	chemical ;

(6)

Total 8 marks

15. (a) (i) fall + rise /eq; (1)  
(ii) bacteria / fungi / microorganisms;  
breakdown / digest / remove (raw sewage) / organic to  
inorganic;  
respiration;  
use of oxygen;  
less sewage / organic material; max  
less respiration; (3)
- (b) line down;  
line up; (2)

Total 6 marks

16. (a) (i) respiration; (1)  
(ii) glucose; (2)  
water; (2)  
(iii) intercostal muscles contract;  
diaphragm contracts;  
ribs move up and out;  
thorax volume increases; max  
thorax pressure decreases; (3)
- (b) lactic acid; (1)

Total 7 marks

PAPER TOTAL 100 MARKS

Paper 2H

1.

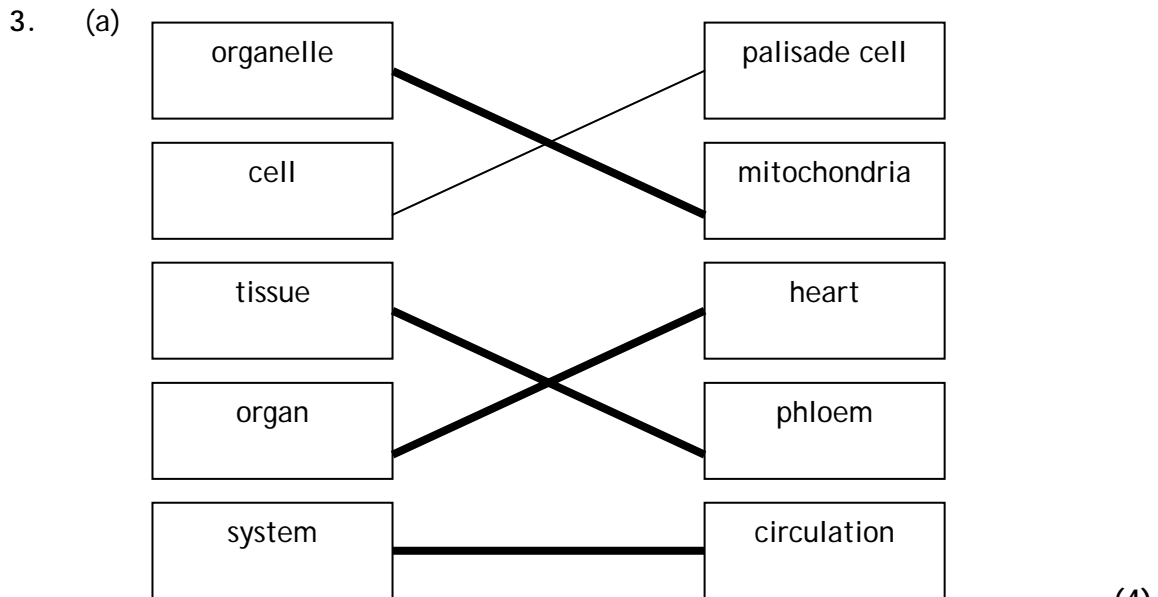
		human / eq;
	single celled; lack nucleus;	Lactobacillus / eq;
virus;		

(5)

Total 5 marks

2. parent male XY and parent female XX;  
male gametes X and Y and female gametes X and X;  
offspring genotype XY, XY, XX, XX or each may be given once;  
male/boy, male/boy, female/girl, female/girl or each may be given once;
- (4)

Total 4 marks



- (b) organelle;
- (1)

Total 5 marks

4. (a) (i) Nn; (1)  
(ii) nn circled; (1)  
(iii) two; (1)
- (b) (i) pancreatic duct blocked / no enzymes from pancreas / eq; (1)  
(ii) amylase / maltase / carbohydrase;  
protease / trypsin / pepsin;  
lipase; (3)  
(iii) enzymes/named enzyme are proteins;  
digested / broken down;  
by stomach enzyme/protease/pepsin; max  
acid / HCl / incorrect pH; (2)

Total 9 marks

5. increase in temperature;  
 rate of reaction / rate of enzyme controlled reaction increases / eq;  
 increased carbon dioxide conc.;  
 for photosynthesis;  
 increased nitrates;  
 used for amino acid / protein synthesis / ;  
 for new cell growth;  
 increase in one other named mineral e.g. magnesium / eq; max  
 use of named mineral e.g. chlorophyll / eq; (6)

Total 6 marks

6. (a) brain;  
 spinal cord; (2)

(b)

fast	slow;	(6)
neurones / nerves;	blood/ blood vessel;	
short	long;	
electrical;	chemical ;	

Total 8 marks

7. (a) (i) fall + rise /eq; (1)  
 (ii) bacteria / fungi / microorganisms;  
 breakdown / digest / remove (raw sewage) / organic to  
 inorganic;  
 respiration;  
 use of oxygen;  
 less sewage / organic material; max  
 less respiration; (3)

- (b) line down;  
 line up; (2)

Total 6 marks

8. (a) (i) respiration; (1)  
 (ii) glucose;  
 water; (2)  
 (iii) intercostal muscles contract;  
 diaphragm contracts;  
 ribs move up and out;  
 thorax volume increases; max  
 thorax pressure decreases; (3)

- (b) lactic acid; (1)

Total 7 marks

9. (a) A bladder;  
 B fallopian tube / oviduct;  
 C ovary;  
 D uterus; (4)
- (b) (i) release/develop eggs;  
 secrete oestrogen; (2)  
 (ii) F on oviduct; (1)  
 (iii) I on uterus; (1)
- (c) urethra; (1)

Total 9 marks

10. (a) (i) yellow;  
 purple; (2)  
 (ii) A - respiration;  
 B - photosynthesis;  
 C - respiration and photosynthesis / eq (3)
- (b) yellow;  
 yellow;  
 yellow; (3)

Total 8 marks

11. haemoglobin;  
 oxygen;  
 disease/infection;  
 antibodies;  
 urea;  
 carbon dioxide;  
 platelets;  
 clot; (8)

Total 8 marks

12. (a) transpiration; (1)
- (b) (i) 2.5 ;; allow 1 for 37.5/3 or 12.5 / 5 (2)  
 (ii) less distance / eq;  
 water molecules have less kinetic energy / move less; max  
 slows diffusion rate; (2)  
 (iii) less distance / eq;  
 stomata close; (2)
- (c) reduces water loss;  
 hairs trap moist air; max  
 reduces concentration / diffusion gradient; (2)

Total 9 marks



13. Method and control

for example:

control predation;  
cover ponds with nets; (2)

control disease;  
use antibiotics; (2)

control water quality;  
filter out nitrogenous waste; (2)

Total 6 marks

14. (a) 5; (1)

(b) moorhen/beetle/boatmen/skaters; (1)

(c) flow of energy; (1)

(d) algae → water fleas → water boatmen → roaches → moorhen;;;

not five organisms -1;  
no water boatman -1;  
no producer -1;  
no arrows/ wrong arrows -2; (2)

(e) energy lost;  
respiration;  
movement;  
excretion; (max)  
egestion/undigested / uneaten; (3)

(f) mayfly larvae increase; (1)

more food/algae available; (1)

OR

mayfly larvae decrease; (1)

more predation by beetle/ water boatman ; (1)

Total 10 marks

15. nucleus from adult / donor mammal (put into);

enucleated / eq;

egg cell;

cell division / mitosis;

embryo;

transferred into the womb / uterus;

(of) surrogate mother;

mammal genetically identical to the adult/donor of original nucleus; (max)

(6)

Total 6 marks

16. (a) (i) A - nitrogen fixation;  
B - denitrification;  
C - nitrification;  
D - death/decomposition; (4)  
(ii) bacteria / *Rhizobium*; (1)
- (b) nitrates;  
absorbed by roots;  
active uptake; max  
amino acids; (3)

Total 8 marks

17. organisms with desired characteristic chosen;  
cross together;  
look for characteristic in offspring;  
breed from those offspring that have the desired characteristic;  
repeat over several generations ;
- example plant species e.g. wheat;  
and example character e.g. stem length;  
example animal species e.g. cattle;  
and example character e.g. milk yield; max  
(6)

Total 6 marks

PAPER TOTAL 120 MARKS

Paper 3

1. (a) (i) thermometer; (1)  
(ii) temperature; (1)
- (b) (i) A - 50;  
B - 27;  
°C; (3)  
(ii) 23; (1)

Total 6 marks

2. (a) iodine; (1)
- (b) blue black;  
brown / yellow / eq; (2)
- (c) (i) Benedict's;  
heat; (2)  
(ii) brick red / eq; (1)  
(iii) time taken to go red / degree of redness; (1)

Total 7 marks

3. (a) (i) 230; (1)  
(ii) 460,000;; (2)  
ALLOW (1) for 5000/2.5
- (b) D C A E H J G B F I; (1)
- (c) more / eq; (1)

Total 5 marks

4. (a) oxygen; (1)
- (b) move lamp different distances / different wattage bulbs; (1)
- (c) count bubbles / measure volume;  
per unit time; (2)
- (d) line going up from origin;  
line levelling at maximum rate of photosynthesis; (2)
- (e) temperature;  
carbon dioxide; max  
size of pondweed; (2)

Total 8 marks

5. (a) (i) same sex;  
age;  
resting period; intensity; max  
(2)  
(ii) so only exercise was affecting breathing rate; (1)
- (b) (i) 26; (1)  
(ii) student B after 4 minutes; (1)
- (c) S scale linear + half grid;  
L line of best fit clear and well drawn;  
A axes correct and labelled;  
P point plotted accurately;; (5)
- (d) (i) directly proportional;  
reference to data; e.g. result at 4 higher than expected (2)  
(ii) need for more oxygen;  
respiration;  
energy / ATP for muscle contraction; max  
need to remove carbon dioxide; (3)
- (e) (i) take more readings / discount anomaly; (1)  
(ii) modification; (2)  
explanation; (2)

Total 18 marks

6. C + and - glucose / range of glucose solutions;  
use of measuring cylinder to obtain range;  
O same size potato used / same cork borer;  
R several pieces used in each solution;  
M mass;  
before and after;  
S same time in solutions; max  
dried before measuring; (6)

Total 6 marks

PAPER TOTAL 50 MARKS