

IGCSE BIOLOGY 4325, NOVEMBER 2005 MARK SCHEME

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.

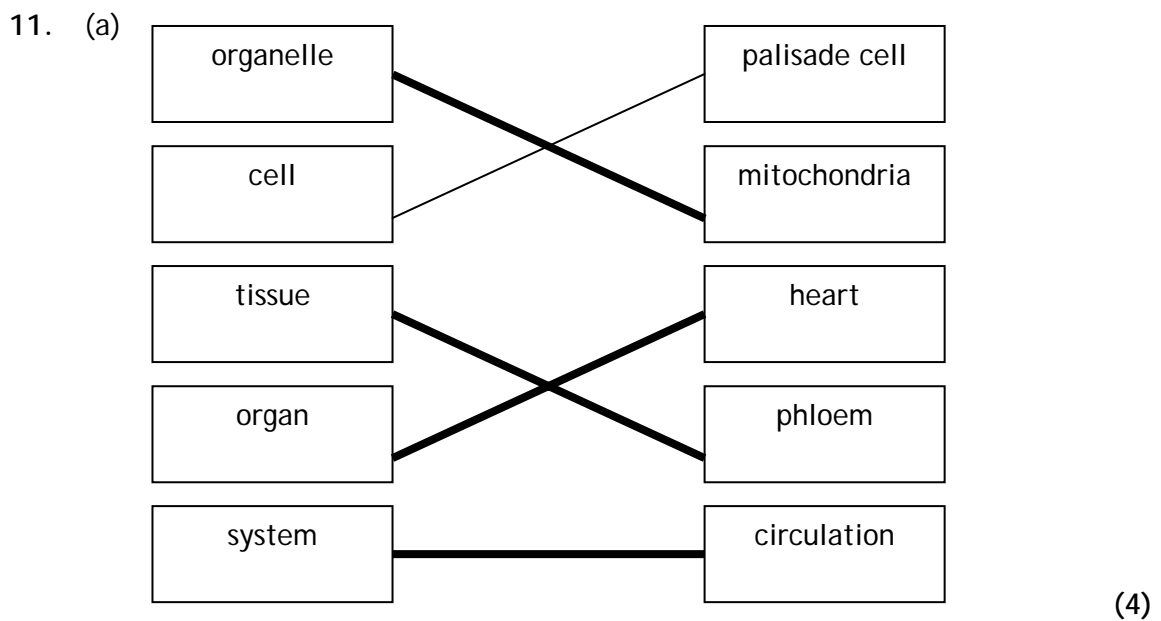
		human / eq;
	single celled; lack nucleus;	<i>Lactobacillus</i> / eq;
virus;		

(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;
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.

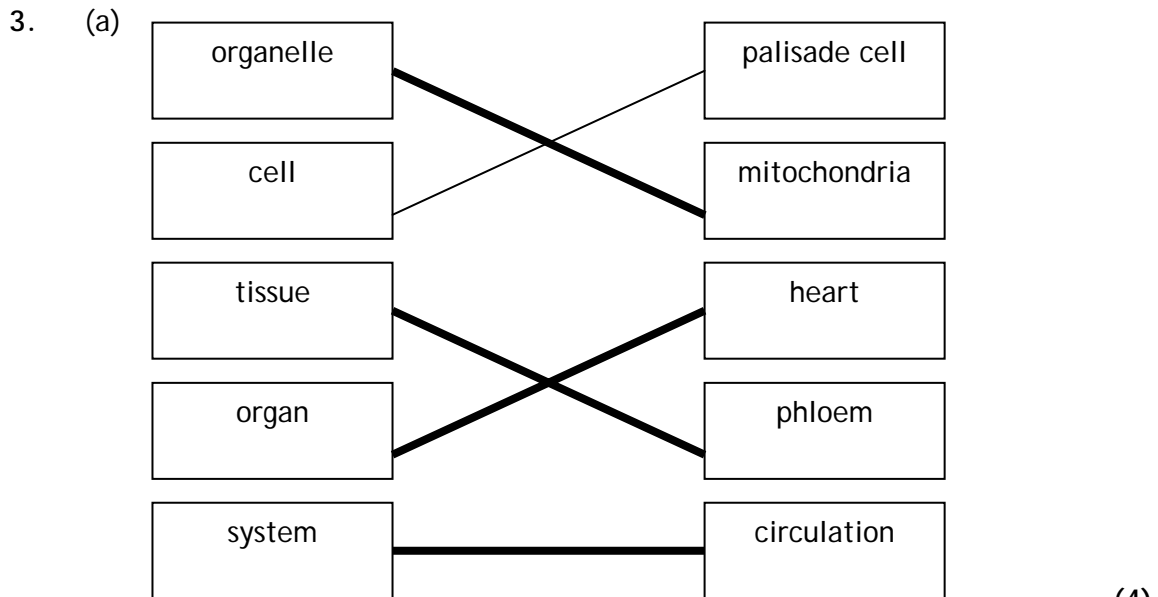
		human / eq;
	single celled; lack nucleus;	Lactobacillus / eq;
virus;		

(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