

## MARK SCHEME for the October/November 2008 question paper

### **0610 BIOLOGY**

**0610/06**

Paper 6 (Alternative to Practical), maximum raw mark 40

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began.

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 must be read in conjunction with the question papers and the report on the examination.

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1 (a) (i)

	egg in water	egg in salt solution
size	larger / bigger / increased / check measurement + units if given <i>I turgid; normal; same; no change</i>	smaller / shrunk / decreased check measurement + units if given; <i>I flaccid</i>
position in liquid	not floating / sunk / on the bottom / low / goes down	floating / in the middle / suspended / goes up and down / AW; <i>I half submerged</i>
external appearance of the egg	smooth / oval / round / turgid / regular <i>I intact / harder / firm / same as / normal</i>	wrinkled / uneven / rough / flaccid / uneven / zigzagged / irregular / lumpy / bumpy / deformed / distorted ; <i>I soft</i>

allow 1 mark per row.

ignore reference to weight / mass / density.

[3]

- (ii)
1. osmosis;
  2. in water gained water; (*direction of movement in correct solution*)  
*[if refer to endosmosis – marking points 1 and 2]*
  3. water surrounding egg higher water potential / less solutes / more dilute / AW  
than inside egg / water gradient / water potential gradient / hypotonic  
hypertonic / water concentration; *[accept if in correct context]*
  4. in salt solution – lost water; (*direction of movement in correct solution*)  
*[if refer to exosmosis – marking points 1 and 4]*
  5. solution surrounding egg lower water potential / more solutes / more  
concentrated in solutes / water potential gradient / hypotonic / hypertonic / AW  
than egg;  
*[allow 1 mark for saying the opposite without giving full details for marking  
points 4 and 5]*
  6. membrane is partially permeable / AW;
  7. AVP e.g. referring to floating / sinking / shape changes in respective solutions;  
*please record number for point awarded beside tick.*  
ignore reference to weight / mass / density.

[max 5]

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- (b) (i) S both axes scaled evenly to use more than half the grid for the line;  
 P plot points accurately; [ $\pm \frac{1}{2}$  small square]  
 L line of best fit / points joined by ruled line;

Bar chart or histogram S and P (check column heights) Max 2.  
 Use letters S, P and L to record ticks or Xs in that sequence. Allow minor extrapolation of line especially with line of best fit.

[3]

- (ii) check graph for answer but need correct units  $\pm 0.5\text{g dm}^3$  or  $\text{g / dm}^3$  or  $\text{g dm}^{-3}$ ;  
 cannot award for bar charts and histograms.

[1]

- (iii) 1. water entering = water leaving / no net water movements / water not gained or lost;  
 2. balanced concentration / isotonic/ equal / equilibrium /  $\psi$  are equal / amount of salt water / water is equal;  
 3. no osmosis / no diffusion of water / no water potential gradient / no concentration gradient / AW; [this is an easy mark to gain]

[3]

- (c) 1. biuret test / Millon's test / xanthoproteic test;  
 2. add biuret A / biuret 1 / sodium / potassium hydroxide / NaOH / KOH **and** biuret B / biuret 2 / copper sulphate / Millons reagent [contains mercury] and needs heat / xanthoproteic [contains nitric acid] and heat;  
 3. same quantity of reagent (*independent of correct reagent*);  
 4. equal sample; *I reference to grinding egg or cooking egg.*  
 5. purple / lilac / mauve (or red for Millon's) (yellow for xanthoproteic);  
 6. darker / deeper / richer / AW purple / red / yellow with more protein or *vice versa* paler for less protein; [*accept even if wrong colour is rejected for marking point 6*]

*I time references.*

7. AVP e.g. colour of yolk interferes with end result;

[max 4]

[Total: 19]

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- 2 (a) 1. respiration / fermentation of yeast cells; *I reference to aerobic / anaerobic.*  
2. producing / releasing carbon dioxide;  
3. carbon dioxide causes solution / indicator becoming acidic / yellow;  
*[needs mention somewhere of carbon dioxide but do not award for concept that carbon dioxide is acidic alone]* [3]
- (b) 1. use a set volume of yeast culture; *[accept 20 cm<sup>3</sup>]*  
2. temperature controlled water bath / at room temperature;  
3. means of collecting gas – gas syringe / inverted gas cylinder or syringe or gas jar or measuring cylinder full of water / test tube;  
*[ignore counting bubbles / height of foam]*  
4. reference to timing;  
5. repeat measurements;  
6. calculate average;  
7. airtight apparatus to stop leakage / putting in a bung;  
8. shake culture (so cells do not settle);  
9. AVP (e.g. reference to adding sugar); [max 6]
- (c) (i) O clear outline representation of yeast cell and more than 8 cm;  
must have a bud, *I minor shading,*  
D double line for cell wall; *[bud should not be cut off with cross wall]*  
L label one from: nucleus / vacuole / nucleolus / cell membrane / mitochondrion / cytoplasm / ribosome / cell wall / daughter cell or bud / mother cell;  
*ring the accepted label and use letters O, D and L for ticks.* [3]
- (ii) size of cell measured on Fig. 2.2 between X and Y between 8.0 and 8.2cm or 80 and 82mm (units essential);  
$$\frac{\text{drawing}}{\text{Fig. 2.2}} = \text{magnification (allow even if forget } \times 5000)$$
*allow ecf.*  
answer (needs to involve  $\times 5000$  and no units given); [3]

[Total: 15]

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- 3 (a) correct lines to structure shown in Fig. 3.1  
a chromosome or (i);  
cytoplasm or (ii);  
nucleus or (iii); [3]
- (b) (i) anthers / pollen sacs / ovary / ovules; [1]  
(ii) ovary / follicle / testis(es) / oviduct / fallopian tube;  
*I reproductive organs.* [1]
- (c) maintain chromosome **diploid** number on fertilisation;  
reference to **haploid** gametes reference to 23 chromosomes;  
variation;  
when gametes fuse the correct chromosome number is attained;  
*[answers are sometimes difficult to follow – read through whole answer and dredge]* [max 1]

[Total: 6]