

## Topic 8 - data-based questions

### Page 378

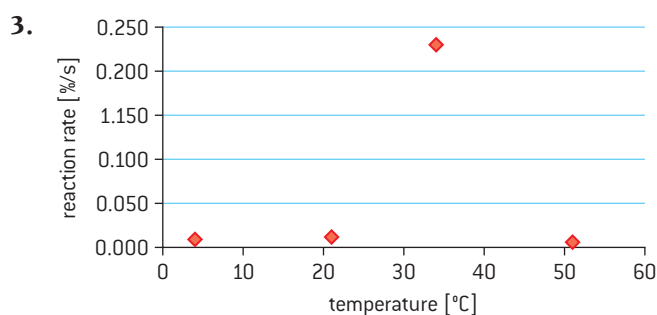
1. OMP decarboxylase has the slowest uncatalysed rate;
2. OMP decarboxylase has the highest catalysed rate;
3. ketosteroid isomerase  $3.8 \times 10^{11}$ ; nuclease  $5.6 \times 10^{20}$ ; OMP decarboxylase  $1.4 \times 10^{24}$ ;
4. OMP decarboxylase is the most effective as it is the slowest reaction without a catalyst and the most rapid reaction with a catalyst;
5. the substrate binds to the active site of the enzyme; the binding leads to a conformational change in the enzyme that strains bonds within the substrate making it more reaction; or it makes collisions between substrates more effective in terms of promoting a reaction;

### Page 379

1. appears to be independent of temperature therefore must be part of the uncertainty of the measuring device;

2.

| Temperature [°C] | Reaction rate [%/s] |
|------------------|---------------------|
| 4                | 0.01                |
| 21               | 0.013               |
| 34               | 0.23                |
| 51               | 0.007               |



### Page 385

1. pyruvate is a substrate for aerobic respiration; pyruvate is broken down in the link reaction which will not occur in absence of oxygen; oxygen is consumed during oxidative phosphorylation which requires reduced molecules produced from pyruvate breakdown;
2. ADP needed to be added so that Krebs cycle could occur; as ADP is raw material for Krebs cycle; no Krebs cycle, no electron transport chain; no electron transport chain, no oxygen consumption;
3. oxygen level would not have declined any lower; as no Krebs cycle would occur and therefore no electron transport chain would occur;
4. all pyruvate has been used up; no more Krebs cycle occurring; so no oxygen consumption in the electron transport chain; so ADP is no longer rate limiting;

### Page 390

1. multiple fracture layers are visible;
2. integral proteins are embedded in both halves of a bilayer; the bilayer fractures down the middle, but the proteins remain embedded in one half giving the studded appearance;
3.  $10^6$
4. other membranes that might be visible are stroma lamellae, inner membrane and outer membrane / membranes of other organelles in the cell;

**Page 394**

- a)** the higher the pH of ADP solution, the more rapid is the rate of ATP production. This is a direct relationship at lower pH but rate of increase increases with pH;  
**b)** because the magnitude of concentration gradient between inside and outside is being increased;
- the lower the incubation pH, the higher the yield of ATP. This also increases the magnitude of the concentration gradient/difference in concentration;
- ATP production powered by movement of  $H^+$  down concentration gradient. Once movement occurs, concentration, difference is lowered so less ATP production;
- in the presence of light, photolysis occurs, which generates  $H^+$  and therefore affects concentration gradient;

**Page 396**

- the dark period causes the concentration of glycerate 3-phosphate to rise. The dark period causes the concentration of ribulose biphosphate to fall;
- a&b)** in the light reactions energy for Calvin cycle is produced; in the dark, RuBP is converted to glycerate-3-phosphate; glycerate-3-phosphate cannot be converted to RuBP; some of the glycerate-3-phosphate is converted to carbohydrate;
- RuBP concentration would rise and glycerate-3-phosphate levels would fall;
- a)** lower concentration of glycerate-3-phosphate;  
**b)** lower concentration of RuBP;

**Page 398**

- bundle sheath chloroplasts are larger; bundle sheath chloroplasts lack grana; bundle sheath chloroplasts have more starch granules; mesophyll chloroplasts have more higher density of thylakoid membrane;
- a)** mesophyll chloroplast because of higher density of thylakoid membrane;  
**b)** bundle sheath chloroplasts because of the presence of the starch granules;  
**c)** mesophyll because of the higher density of thylakoid membrane.