**Name of the Student**:_____
**Max. Marks : 24 Marks** **Time : 24 Minutes**

## Mark Schemes

### Q1.

(a) 1. No effect at 25°C

*The question only refers to plants <u>with</u> GB*

*1. Reject same mass*

2. Keeps growing at 30°C and 35°C / up to 35°C (more than without GB);

3. Above 35°C, falls but grows more than plant without GB;

*3. Accept at all temperatures above 25°C more growth than without GB*

**2 max**

(b) (i) <u>Significantly</u> different / SEs do not overlap ;

*Accept converse without GB*

**1**

(ii) (As temperature increases,)

1. Enzyme activity reduced / (some) enzymes denatured;

2. Less photosynthesis, so fewer sugars formed;

3. Less respiration / less energy / ATP for growth;

4. Less energy for named function associated with growth

*4. Eg mitosis, uptake of mineral ions*

**4**

(c) 1. (Rubisco activase attaches to thylakoid and) this changes shape / tertiary structure (of enzyme) / blocks active site / changes active site;

*Note - question states enzyme stops working when it attaches to thylakoid, not before*

*1. Accept rubisco in this context*

2. (This) prevents substrate / RuBP entering active site / binding;

*2. Accept prevents ES complex forming*

*2. Accept no longer complementary to substrate / RuBP*

**2**

(d) 1. GB prevents / reduces binding of rubiscoactivase to (thylakoid membrane);

*1. Accept enzyme instead of rubiscoactivase. Accept rubisco*

2. (Prevents it) up to 35°C;

3. (So) rubiscoactivase / enzyme remains active;

4. (So) photosynthesis / light-independent stage still happens;

*4. Accept descriptions of light-independent stage*

5. Above 35°C, some binding still occurs but less than without GB, so less reduction in growth;

**4 max**

(e) 1. Looked for information / journals, on crop plants that grow at high temperatures;

*1. "other research" is minimum accepted*

*1. Accept previous experiments research with temperature resistant crops*

*Ignore simple references to looking at previous studies / other plants - need to relate to this context*

2. (Crop plants cited in this research) contain / make GB;

3. So assumed making plants produce GB makes them resistant to high temperatures;

**2 max**

**[15]**

Q2.

(a) (i) 1. Negative correlation;
*Accept: description for 'negative correlation'*
*Neutral: 'correlation'*
*Reject: positive correlation*

2. Wide range;

3. Overlap;

4. (Graph suggests that) other factors may be involved (in age of onset);
*2 / 3 Accept the use of figures from the graph*
*2 / 3 Can refer to age of onset or number of CAG repeats*
*Ignore references to methodology*

**3 max**

(ii) 1. Age of onset can be high / symptoms appear later in life;
*Accept: 'gene' for 'allele'*

2. (So) individuals have already had children / allele has been passed on;

***OR***

3. Individuals have passed on the allele / already had children;

4. Before symptoms occur;

**2 max**

(b) (i) 1. Person **K**;

2. (As has) high(est) band / band that travelled a short(est) distance / (er) so has large(st) fragment / number of CAG repeats;
*Must correctly link distance moved and fragment size*

**2**

(ii) Run fragments of known length / CAG repeats (at the same time);
*Accept: references to a DNA ladder / DNA markers*
*Do not accept DNA sequencing*

**1**

(iii) Homozygous / (CAG) fragments are the same length / size / mass;
*Accept: small fragment has run off gel / travelled further*

**1**

**[9]**