UNEB GUIDE PAPER II-2023.

AVP- alternative valid point.
(Semicolon);-marking point.
/ (oblique stroke)-separates alternatives within the mark point.

1.a(i) **Initially or (at 8°C),** rate of photosynthesis was zero**;**
From **8°C to 30°c,** rate of photosynthesis increased **rapidly/steeply/drastically/sharply;**
From **30°c to 40°c**, rate of photosynthesis increased gradually to peak or maximum**;**
From **40°c to 48°c**, rate of photosynthesis decreased rapidly**;**
From **48°c to 58°c**, rate of photosynthesis decreased gradually to zero**;**
(ii) From **13°c to 45°c**, rate of respiration increased gradually to peak**;** because respiratory enzymes work **slowly/less sensitive** to temperature**;** so that the rate of respiration doesnot exceed rate of photosynthesis**;** to avoid all photosynthetic products from being metabolized/respired/used up in respiration for the net gain in biomass to occur**;**
AVP- low metabolic rate of plants hence don't require much energy.
AVP-Respiration depends on carbohydrates which are products of photosynthesis**;** so increase in photosynthesis increases amounts carbohydrates produced increasing the rate of respiration**;**
Beyond **45°c,** rate of respiration decreased to zero because temperature exceeded the optimum causing denaturation of respiratory enzymes**;**

(iii) From (just after) **40°c to 45°c,** rate of respiration increased gradually while rate of photosynthesis decreased rapidly**;** because photosynthetic enzymes have lower optimum temperature than respiratory enzymes**;** so photosynthetic enzymes denature before respiratory enzymes**;**
Rate of respiration decreased less rapidly while photosynthetic rate decreased more rapidly after the peak**;** because

photosynthetic enzymes are more sensitive to temperature compared to respiratory enzymes; so photosynthetic enzymes are easily denatured than respiratory enzymes;

From 58°c to (just before) 70°c, rate of respiration decreased gradually while rate of photosynthesis was zero; because the remaining few respiratory enzymes are denatured while all photosynthetic denatured;

(iv) With increasing temperature, both the rate of photosynthesis and respiration increase to peak; (maximum) because of increased activation of enzymes;
Further increase in temperature, (At high temperatures) both the rate of photosynthesis and respiration decrease to zero; because of denaturation of enzymes;
At 46.5°c, rate of photosynthesis and rate of respiration were equal/same/equivalent because of the attainment of the compensation point;
With increasing temperature, the rate of photosynthesis increased rapidly while rate of respiration increased gradually (to their peaks) because photosynthetic enzymes are more sensitive to temperature; to carry out photosynthesis at very low temperature producing sugars (glucose) which is respired for survival of plant;
Accept any other phrasing that makes Sense.
b) Similarities
(In both)
- Amount of carbondioxide absorbed increased;
- Amount of carbondioxide absorbed attained the maximum or peak;
- Amount of carbondioxide absorbed was equal or same or equivalent at 30°c;
- Amount of carbondioxide absorbed decreased after the peak;
- Amount of carbondioxide absorbed start at the same temperature;

Differences

Below 30°c, amount of carbondioxide absorbed by Plant A was higher while that of Plant B was lower;
Above or Beyond 30°c, amount of carbondioxide absorbed by Plant B was higher while that of Plant A was lower;
Amount of Carbondioxide absorbed by Plant A attains a peak (maximum) at lower temperature while amount of Carbondioxide absorbed by Plant B attains peak at a higher temperature;
Amount of Carbondioxide absorbed by Plant B attains a higher peak (maximum) while that of Plant A attains a lower Peak;
Amount of Carbondioxide absorbed by Plant A attains a minimum value while that of plant B doesn't;
Initially (at 10°c) amount of carbondioxide absorbed by Plant A was higher while that of plant B was lower;
Between 30°c and 40°c, amount of carbondioxide absorbed by Plant A decreased while that of plant B increased;
Beyond 40°c, amount of carbondioxide absorbed by plant A decreased rapidly while that absorbed by plant B decreased gradually;
c) Plant B- C4 plant; because enzymes have higher optimum temperature; photosynthetically more efficient than plant B/absorbed more carbondioxide;
Plant A- C3 plant; because photosynthetic enzymes have lower optimum temperature; lower photosynthetic efficiency/absorbed less carbondioxide;
d) Light intensity; more photons of light increases amount of ATP and reduced NADP increasing photosynthesis; too much light bleaches chlorophyll/photo-oxidation of chlorophyll; less amount of light lowers photosynthesis due to reduced ATP and reduced NADP;
Water; low water amount causes flaccidity of cells closing stomata preventing entry of Carbondioxide and decreasing photosynthesis; suitable amount of water makes leaves turgid and stomata open to take up carbondioxide;

Mugwe martin- 2023.

AVP- Chlorophyll concentration, Herbicides eg DCMU, oxygen concentration, Pollutants eg soot.

e) Carbondioxide from the atmosphere is used to form malate in the Mesophyll cells; Malate is shunted (actively transported) through plasmodesmata into bundle sheath cells where it produces carbondioxide, pyruvate and hydrogen atoms which reduce the oxidized NADP in bundle sheath cell;

Carbondioxide acceptor is RuBP (ribulose bisphosphate); RUBP combines or reacts with C02 to form six carbon unstable compound catalyzed by RuBP carboxylase; six carbon unstable compound breaks down into two molecules of GP (Glycerate-3-phosphate); ATP is used to phosphorylate the two molecules of GP to form two molecules of glycerate bisphosphate;

$NADPH_2$ reduces the two molecules of glycerate bisphosphate; to glyceraldehyde-3-phosphate (GALP)

Some GALP is used to form organic molecules like carbohydrates, proteins and lipids;