Marks

Question 32 — Biochemistry (25 marks)

(a) (i) Define what is meant by the *half-life of an isotope*. **1**

(ii) Describe ONE use of radioisotopes in biochemistry. **1**

(iii) Outline the evidence provided by Hill and Scarisbruck, and Ruben that increased understanding of photosynthesis. **3**

(b) In the seventeenth and eighteenth centuries, progress towards understanding plant growth was assisted by the experiments of:

- Van Helmont
- Hales
- Ingen-Housz
- Senebier
- Saussure.

(i) Describe an investigation that could test the observation(s) of ONE of the above scientists. **4**

(ii) What variables would need to be controlled in this investigation? **2**

Question 32 continues on page 32

Marks

Question 32 (continued)

(c) The data in the table shows the results of an experiment which examined the rate of photosynthesis (as a percentage of the maximum rate) for a group of plants exposed to light of different wavelengths.

Wavelength (nm)	*Rate of photosynthesis* (% of maximum)
400	23
450	98
500	70
550	46
600	60
650	96
700	67
750	0

(i) Graph the data on the graph paper provided on page 33. **4**

(ii) Using the above information, predict what rate of photosynthesis would occur if these plants were exposed to light of 575 nm wavelength for a prolonged period of time. **1**

(iii) Explain why the action spectrum of photosynthesis does not match that of chlorophyll. **2**

(d) Explain the role of photosynthesis research in confirming the relationship between ATP production and photosynthesis. **7**

End of paper