

OBAFEMI AWOLOWO UNIVERSITY, ILE-IFE
B.AGRIC. (PLANT SCIENCE)
FACULTY OF AGRICULTURE
RAIN SEMESTER EXAMINATIONS 1989/90 SESSION
PSC 502 - PLANT PHYSIOLOGY

SEPTEMBER, 1990

TIME ALLOWED: 3 HOURS

Answer Questions 1, 2 and any Two others

1. Provide concise but brief answers to the following:-

- a) The accessory pigments in photosynthesis.
- b) "Biological function is completely dependent upon water, and the properties of life are often directly a result of the properties of water" Explain.
- c) Host specificity and strain variation in legume root bacteria.
- d) Nitrogen fixation and nitrate reduction.
- e) "Photosynthesis is a sensitized, photochemical, oxidation-reduction." Discuss.
- f) Photosynthetic phosphorylation and oxidative phosphorylation.
- g) Absorption spectrum and action spectrum.
- h) The mineral needs of a fruiting cacao plant compared with those of a milking cow.

(40 marks)

2. a) Structurally identify the compounds combining with CO_2 in the C_3 and C_4 pathways of photosynthesis.

b) Show a key reaction in which any of the products of the light reactions is utilized in the 'dark' reactions of photosynthesis.

c) Phosphopyruvate synthetase and phosphoxylulose kinase are key enzymes in the C_4 and C_3 pathways, respective;

i) Why do we call them 'key' enzymes?

ii) Structurally show the reaction each of the two catalyses, with the reactants, coenzymes, cofactors, and products.

d) Chemical structures are optional for (i) to (iii) below. But indicate the reactant, product, enzyme and cofactors necessary:-

i) the reaction catalysed by triosephosphate isomerase

ii) a transketose reaction in the C_3 pathway.

iii) an aldolase reaction in the C_3 pathway. (20 marks)

3. The light reactions of photosynthesis have been proposed to contain two photoacts.

- a) Schematically illustrate this system
- b) Show by individual reactions the steps involved in these light reaction: important investigators who had contributed to our understanding of the processes.
- c) Give the summary equation for these reactions in a cowpea plant

(20 marks)

4. Why are the dark reactions of photosynthesis so called?

Show the significant differences in the photosynthesis in sugarcane leaves and in soybean leaves.

Can you relate these differences to anatomical and other differences in the two plants?

(20 marks)

5. a) Compare the N in the air with other sources of N.
b) Distinguish fully between soil solution and solution culture.
c) Briefly discuss the nutrition media of aquatic and terrestrial plants.
d) Okanlawon wishes to grow soybean for grain production on commercial scale at Sepeteri in Oyo North.

Advise him on the importance of, and the benefits derivable to him by, inoculating his seeds before planting

(20 marks)