

國立中山大學 101 學年度碩士暨碩士專班招生考試試題

科目：生物化學【海資系碩士班甲組選考】

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I. (5%) Indicate whether each of the following pairs of sugars consists of

(a) anomers, (b) epimers, or (c) an aldose-ketose pairs

- () 1. D-glucose and D-mannose
- () 2. D-glyceraldehyde and dihydroxyacetone
- () 3. α -D-glucose and β -D-glucose.
- () 4. D-glucose and D-fructose.
- () 5. D-galactose and D-glucose.

II. (5%) Match the catabolic products in the right column with the amino acids in the left column from which they can be derived.

- | | |
|-------------------|----------------------------|
| 1. () Alanine | a. α -Ketoglutarate |
| 2. () Aspartate | b. Pyruvate |
| 3. () Isoleucine | c. Oxaloacetate |
| 4. () Glutamine | d. Succinyl-CoA |
| 5. () Serine | |

III. (30%) Explain the following terms:

- 1. glycobiology:
- 2. primary structure of proteins:
- 3. proteomes:
- 4. SDS-PAGE:
- 5. transcription:
- 6. Western Blotting:
- 7. Z scheme of photosynthesis:
- 8. rubisco:
- 9. glucogenic amino acids:
- 10. acetyl CoA carboxylase:

IV. 問答題：

- 1. (4%) What are the minimal requirements for DNA replication?
- 2. (3%) Explain briefly how enzymes accelerate the rate of reactions.
- 3. (2%) The sequence 6 bp restriction cleavage site for EcoRV is GATXXX. What is the complete sequence of the double stranded restriction site?
- 4. Draw the structure:
(1) (3%) α -D-Glucopyranose: (2). (3%) β -D-Ribofuranose :
- 5. (10%) Give the name, three, one-letter abbreviation and draw the structure of the following amino acids: negative charged at neutral pH .

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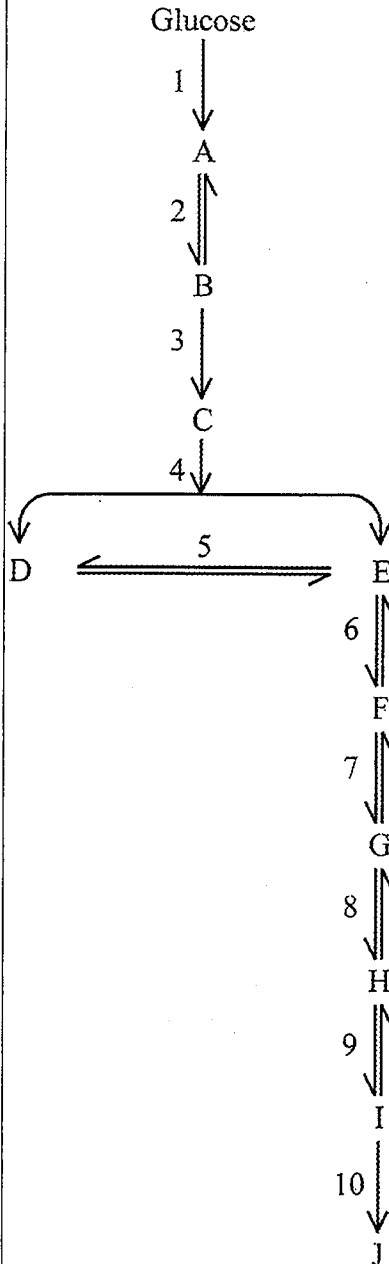
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6. (23%) (1) Name A, B, C, D, E, F, G, H, I, J of the intermediates in glycolysis pathway. (A~J 請寫英文全名)

(2) Name the enzymes of step 1~ 10 (請寫英文全名)

(3) Which steps 消耗 ATP? 產生 ATP? 產生 NADH?



7. (6%) The ATP Synthase of chloroplast closely resembles those of mitochondria. Please compare the photosynthesis and oxidative phosphorylation.

8. (2%) What are the two products of the “light reactions” needed in order for the Calvin cycle to function?

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9. (4%) Calculate the number of mole of ATP that could be produced from the complete oxidation of one mole Arachidate ($C_{20:0}$), by an aerobic organism. Show your work clearly.