

BOWEN UNIVERSITY, IWO, OSUN STATE
(of the Nigerian Baptist Convention)
COLLEGE OF AGRICULTURE, ENGINEERING AND SCIENCE (COAES)
BIOCHEMISTRY PROGRAMME
SECOND SEMESTER, 2022/2023 SESSION

COURSE CODE: BCH 316

CREDITS: 3

**COURSE TITLE: BIOCHEMICAL ENERGETICS AND CARBOHYDRATE
METABOLISM**

TIME ALLOWED: 2 ½ HOURS

**INSTRUCTIONS: ANSWER TWO QUESTIONS FROM EACH SECTION
ANSWER EACH QUESTION ON A NEW PAGE**

SECTION A

Question 1

- (a) If $\Delta G^{\circ} = -35\text{KJ/mol}$, what is the value of the equilibrium constant of ATP hydrolysis at 47°C ?
($R = 8.314\text{J/K/mol}$, $0^{\circ}\text{C} = 273\text{K}$) ($\Delta G^{\circ} = -RT\ln K'_{eq}$) **(10 marks)**
- (b) In five sentences and with the aid of a diagram, describe the ATP cycle. **(10 marks)**

Question 2

- (a) Define the following and show their mathematical relationship:
- i. entropy
 - ii. enthalpy
 - iii. Gibb's free energy **(10 marks)**
- (b) Enumerate the advantages and disadvantages of batch and continuous fermentation **(10 marks)**

Question 3

- (a) Write short notes on the following cycles:
- i. Calvin **(5 marks)**
 - ii. Uronic **(5 marks)**
 - iii. Glyoxylate **(5 marks)**
- (b) State five uses of fermentation **(5 marks)**

SECTION B

Question 4

Write extensively on the various steps in glycolysis **(20 marks)**

Question 5

- (a) Explain the different steps of tricarboxylic acid cycle **(16 marks)**
- (b) State any two (2) importance of gluconeogenesis **(4 marks)**

Question 6

- (a) What do you understand by oxidative phosphorylation? **(4 marks)**
- (b) Describe how pyruvate kinase can be regulated in a glycolytic pathway **(8 marks)**
- (c) State the deficient enzymes of the following carbohydrate metabolism disorders
- i. Galactosemia **(1 mark)**

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| ii. | Hereditary fructose intolerance | (1 mark) |
| iii. | Lactose intolerance | (1 mark) |
| iv. | Pyruvate metabolism disorder | (1 mark) |
| v. | Von Gierke disease | (1 mark) |
| vi. | Andersen's disease | (1 mark) |