

# UNIVERSITY OF TECHNOLOGY, JAMAICA

## FACULTY OF HEALTH AND APPLIED SCIENCE SCHOOL OF PHARMACY AND HEALTH SCIENCE

### FINAL/RESIT EXAMINATION

GROUP: BPHARM 1/ BMT 2

DATE: MAY 03, 2004

SUBJECT: BIOCHEMISTRY

DURATION: 2 HOURS

INSTRUCTIONS: ANSWER ANY TWO QUESTIONS

CHY1007

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#### QUESTION 1.

- a) The kinetics of an enzyme are measured as a function of substrate concentration in the presence and absence of inhibitor.

[S] ( $\mu$ MOLES)	(VELOCITY IN $\mu$ MOLES/MIN)	
	NO INHIBITOR PRESENT	INHIBITOR PRESENT
3.0	10.4	4.1
5.0	14.5	6.4
10.0	22.5	11.3
30.0	33.8	22.6
90.0	40.5	33.8

- i) Construct a double reciprocal plot for  $1/V$  vs.  $1/[S]$  for this data. (10 marks)
- ii) What are the values of  $V_{max}$  and  $K_m$  in the absence and presence of inhibitor? (15 marks)
- iii) What type of inhibition is this and why? (3 marks)
- b) Discuss the levels of structure in protein architecture. (8 marks)
- c) Draw the structure of a named amino acid having:
- an aliphatic side chain
  - an aromatic side chain
- (2 + 2 marks)
- d) Explain lactose intolerance and why the prevalence differs in a named European vs. Oriental country. (10 marks)

## **QUESTION 2**

- a) Outline the breakdown of a molecule of glucose as it goes through glycolysis, the Krebs cycle and the electron transport chain and calculate the net ATP yield after all three of these pathways are completed. (15 marks)
- b) Explain the biochemistry behind the Atkins diet. (10 marks)
- c) Discuss the symptoms, infectious agent and possible genesis of variant Creutzfeldt-Jakob Disease (vCJD). (10 marks)
- d) (i) Outline the steps in the beta oxidation of a saturated twenty carbon fatty acid and calculate the number of ATP produced.  
(ii) Describe lipid thermogenesis. (10 + 5 marks)

## **QUESTION 3.**

- a) Explain in detail how nuclear DNA directs the production of a protein molecule. (15 marks)
- b) (i) Illustrate a method by which one could implant a foreign gene into bacteria by using a plasmid vector and then test for successful implantation. (10 marks)
- c) With the use of an appropriate hormone, give a detailed explanation of how the hormonal second messenger system works. (15 marks)
- d) Discuss the importance of biochemistry to the study of Pharmacy or Medical Technology. (10 marks)

**“END OF PAPER”**