RAJARATA UNIVERSITY OF SRI LANKA

FACULTY OF APPLIED SCIENCES

B. Sc (Special) Degree in Chemistry

Third Year Semester II Examination– April / May 2016

CHE 3202-II - Advanced Biochemistry

Answer any **FOUR** questions Time: **TWO** hours

1.

(a) Giving 4 examples each define glucogenic and ketogenic amino acids (20 Marks)

(b) State the function of the following enzymes in amino acid metabolism
i. alanine transaminase
ii. Glutaminase
iii. Asparaginase (20 Marks)

(c) Describe the following disorders associated with amino acid metabolism.
i) phenlyketonuria (PKU)
ii) Albinism (30 Marks)

(d) Describe the Glucose alanine cycle (30 Marks)

2.

(a) Explain the following terms stating their functions where necessary

i. Replication fork
ii. Primer
iii. DNA polymerase
iv. Leading strand and lagging strand (40 Marks)

(b) Briefly describe the elongation process of the protein synthesis (30 Marks)

(c) Given below is a DNA of which the bottom stand (in bold) is the template strand. Predict the RNA transcript of the DNA and assuming the whole transcript act as the mRNA predict the amino acid sequence using the genetic codes given below. (30 Marks)

T A C C G G C G T T A G A C A A G T G C G T A C A C A (template strand)

A T G G C C G C A A T C T G T T C A C G C A T G T G T

1st letter	Second Letter: U		Second Letter: C		Second Letter: A		Second Letter: G		3rd letter
U	UUU	Phe	UCU	Ser	UAU	Tyr	UGU	Cys	U
	UUC		UCC		UAC		UGC		C
	UUA	Leu	UCA		UAA	Stop	UGA	Stop	A
	UUG		UCG		UAG	Stop	UGG	Trp	G
C	CUU	Leu	CCU	Pro	CAU	His	CGU	Arg	U
	CUC		CCC		CAC		CGC		C
	CUA		CCA		CAA	Gln	CGA		A
	CUG		CCG		CAG		CGG		G
A	AUU	Ile	ACU	Thr	AAU	Asn	AGU	Ser	U
	AUC		ACC		AAC		AGC		C
	AUA		ACA		AAA	Lys	AGA	Arg	A
	AUG	Met	ACG		AAG		AGG		G
G	GUU	Val	GCU	Ala	GAU	Asp	GGU	Gly	U
	GUC		GCC		GAC		GGC		C
	GUA		GCA		GAA	Glu	GGA		A
	GUG		GCG		GAG		GGG		G

3.

(a) State the similarities and differences between the hexokinase and Glucokinase.

(30 Marks)

(b) Explain 3 mechanisms (ways) that the glycolytic pathway would be controlled

(30 Marks)

(c) Compare the anareiobic and aerobic cellular respiration (40 Marks)

4.

(a) Explain the following statements

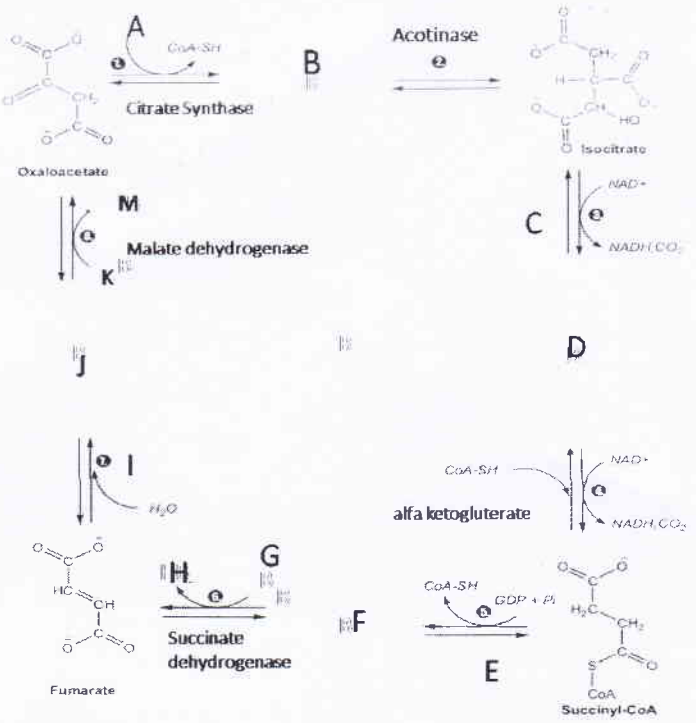
i. Though fatty acids would provide more energy when through catabolism glucose is used as the main source of energy

ii. Ingestion of excess alcohol would lead to formation of a fatty liver

iii. TCA cycle not only produces ATP but is a pathway that involves many anaplerotic reactions

(45 Marks)

(b) Complete the following TCA cycle stating the metabolites and enzymes from A-M (each incorrect answer would give you minus two points (-2))



(55 Marks)

5.

(a) Showing one cycle of the beta oxidation pathway, calculate the energy produced when a fatty acid with 18 carbon chain is metabolized through the beta oxidation path way and its metabolites entering TCA cycle.

(40 Marks)

(b) Gluconeogenesis is not simply the reverse of the glycolysis. Explain the above statement giving the major differences of the two pathways.

(30 Marks)

(c) Briefly state the structure of glycogen and state the three enzymes involved in glycogen breakdown describing their function

(30 Marks)

--------//--------