

GARISSA UNIVERSITY

UNIVERSITY EXAMINATION 2017/2018 ACADEMIC YEAR <u>ONE</u> <u>SECOND</u> SEMESTER EXAMINATION

SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES

FOR THE DEGREE OF BACHELOR OF ARTS SCIENCE

COURSE CODE: CHE 214

COURSE TITLE: BIOCHEMISTRY

EXAMINATION DURATION: 3 HOURS

DATE: 06/04/18

TIME: 09.00-12.00 PM

INSTRUCTION TO CANDIDATES

- The examination has SIX (6) questions
- Question ONE (1) is COMPULSORY
- Choose any other THREE (3) questions from the remaining FIVE (5) questions
- Use sketch diagrams to illustrate your answer whenever necessary
- Do not carry mobile phones or any other written materials in examination room
- Do not write on this paper

This paper consists of FIVE (5) printed pages

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please turn over

QUESTION ONE (COMPULSORY)-MULTIPLE CHOICE QUESTION

1)	What is the primary characteristics that distinguishes prokaryotes from Eukaryotes?	[2 marks]
	A. Prokaryotic cells are always larger than eukaryotic cells	
	B. Eukaryotes have internal organelles; prokrayotes do not	
	C. Eukaryotes produce and use ATP, Prokaryotes do not	
	D. Eukaryotic cells have both DNA and RNA; Prokaryotic cells possess RNA only.	
	E. None of the above	
2)	The rough endoplasmic reticulum	[2 marks]
	A) Plays a role in steroid synthesis	
	B) Protein synthesis occurs here	
	C) Genetic material is found here	
	D) Detoxification occurs here	
	E) Is found in the lysosomes.	
3)	Which of the following happens when protein folds	[2 marks]
	A) Protein adopts its lowest energy state form	
	B) Most of non-polar and hydrophobic residues are found buried in the protein	
	C) The charged residue are found on the outside of the protein	
	D) Secondary structural elements form	
	E) All of the above	
4)	The double bond character of the peptide is important because	[2 marks]
	A) Allows the Peptide bond to be protonated	
	B) Allows the R-groups to interact with each other	
	C) Limits the free rotation about the peptide backbone	
	D) Promotes C-configuration of the R-groups	
	E) All of the above	
5)	The structure of deoxyribonucleic acid does not have	[2 marks]
	A) Adenine	
	B) Cytosine	
	C) Uracil	
	D) Guanine	
	E) Thymine	
6)	Which of the following is not true about an α –Helix	[2 marks]

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- A) The side chains extend radially outwards from the helix axis
- B) It is held together primarily by hydrogen bonds
- C) It usually involves multiple polypeptide bonds
- D) The peptide backbone is on the inside of the helix
- E) It has a rod-like structure
- 7) Enzymes
 - A) Are composed primarily of polypeptides, which are monomers of amino acids
 - B) Have defines structures
 - C) Can bind prosthetic groups such as metal ions or cofactors that participate in enzyme reaction
 - D) Bind their structures at active sites
 - E) All the statements are true
- 8) Seven of the ten reactions in the glycolytic pathway have free energy (ΔG) values closes to Zero. What does this tell us about those reaction [2.5 marks]
 - A. They are near equilibrium reactions
 - B. They are not control points for pathway regulation
 - C. They are reversible reaction
 - D. All of the above
 - E. None of the above
- 9) Dehydrogenase is an enzyme that catalyses:
 - A. A phosphorylation reaction
 - B. An oxidation-reduction (redox) reaction
 - C. The release of proton from an acid
 - D. A hydrolysis reaction
 - E. An isomerization reaction

10) Elevated levels of the hormone _______ stimulates release of glucose from glycogen [2.5 marks]

- A. Insulin
- B. Estrogen
- C. Epinephrine
- D. Ergosterol
- E. Testosterone

11) Which of the following is not a medical condition associated with blood PH? [2 marks]

- A. Metabolic acidosis
- B. Respiratory alkalosis
- C. Respiratory Acidosis
- D. Metabolic alkalosis



[2 marks]

[2 marks]

Ser. No. EDU 85/18 E. Phenylketonuria	
12) Beta pleated sheets are a part of which structure of proteins	[2 marks]
A) primary	
B) Secondary	
C) Tertiary	

D) Quarterly

QUESTION TWO

(a) What is meant by the 'Primary,' 'Secondary,' 'Tertiary,' and 'Quaternary' structures of a protein

[3 marks]

[3 marks]

- (b) Why do almost all enzyme-catalysed reactions show a pH optimum? [2 marks]
- (c) State the biological importance of lipids?(2 marks)
- (d) What are the two forces or bonds that contribute strongly to the stability of specifically folded DNA and RNA structures [2 marks]
- (e) Identify 3 polysaccharides existing naturally and mention their biological importance [3 marks]
- (f) State any three biological functions of proteins

QUESTION THREE

- (a) State four agents of protein denaturation [4 marks]
- (b) Shown below is the structure of the amino acid Tyrosine, draw the predominate form(s) of Tyrosine at the following PH values [6 marks]



- a) PH 5
- b) PH 10
- (c) State 5 biological roles of minerals and vitamins to the body?

[5 marks]

QUESTION FOUR

(a) State the 4 major non-covalent forces involved in the structure and functions of biomolecules

(b) Differe (c) Briefly i. ::	ntiate between Starch and Cellulose discuss the following classes of carbohydrates giving examples of each class. Monosaccharide's;	[3 marks] [2 marks] [6 marks]	
11. iii	Disaccharides;		
(d) Explai	n the effects of temperature on enzyme catalyzed reactions	[4 marks]	
QUESTION	FIVE		
(a) Discuss i	n detail models for enzyme/substrate interactions	[8 marks]	
(b) Write and explain the reactions of Triacylglycerol Hydrolysis in adipose tissue and Skeletal M			
		[7 marks]	

QUESTION SIX

(a) E	Explain how Enzymes works using Michaels-Menten model	[7 marks]
(b) E	Discuss briefly glycolysis with schematic Diagram	[8 marks]