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FACULTY OF BASIC AND APPLIED SCIENCES

DEPARTMENT OF PHYSICAL AND CHEMICAL SCIENCES
FIRST SEMESTER 2018/2019 B,Sc EXAMINATIONS

BCH 201- GENERAL BIOCHEMISTRY I

Time: 2 hrs 30 mins

Instruction: Attempt three (3) questions out of the five questions. Question 1 is compulsory and carries 30 marks.

1. (a) Define pH
(b) Why is pH important in Biology?
(c) How can you determine the pH of a given solution?
(d) Calculate the pH:
 - (i) of 0.5M Hydrochloric acid solution?
 - (ii) If 25.0 ml of 0.160M of NaOH are added to 50ml of 0.100M HCl, what is the pH of the resulting solution?
 - (e) What are buffers?
(f) Define Buffer Capacity
(g) At what point does a buffer works best?
(h) From the reaction, $HA \leftrightarrow H^+ + A^-$; Derive $pH = pK_a + \log \frac{[A^-]}{[HA]}$.
(i) A buffer solution contains equal concentrations of acetic acid and sodium acetate. Calculate the pH of the buffer.
- 30 marks
2. (a) Clearly state the similarities and differences between Amylose and Amylopectin 5 marks
(b) List five (5) basic functions of proteins 5 marks
(c) Classify the 20 amino acids based on the side chains attached to the amine. 7 marks
(d) Illustrate with suitable diagram and examples, the four levels of structural organization of proteins. 8 marks
3. (a) With specific examples, differentiate between
 - (i) Purines and Pyrimidines 4 marks
 - (ii) DNA and RNA 4 marks
 - (iii) Monocistronic and Polycistronic gene 4 marks
 - (iv) Nucleosides and Nucleotides
 - (b) Showing the right sequence, describe
 - (i) Palindrome 3 marks
 - (ii) Hairpin 3 marks
 - (iii) Cruciform 3 marks

4. (a) (i) Give the name and structure of a 3, 4, 5, 6, and 7 carbon atom sugars 5 marks
(ii) Give two examples of a disaccharide and polysaccharide 4 marks
- (b) With the aid of annotated diagrams only, describe
- (i) Enzyme 2 marks
(ii) Substrate 2 marks
(iii) Enzyme-substrate complex 2 marks
- (c) Write short notes on any four (4)
- (i) Active site 2 marks
(ii) Enzyme inhibitors 2 marks
(iii) Activation Energy 2 marks
(iv) Cofactors 2 marks
(v) Coenzymes 2 marks
5. (a) Giving correct examples, write short notes on 5 marks
- (i) Epimers 5 marks
(ii) Enantiomers 5 marks
(iii) Anomers 5 marks
- (b) List five examples each of saturated and unsaturated fatty acids you know. 5 marks
- (c) Margarine is said to be made with healthy unsaturated vegetable oil, if the vegetable oil is liquid at room temperature, then why is margarine solid at room temperature? 5 marks