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FACULTY OF BASIC AND APPLIED SCIENCES
DEPARTMENT OF PHYSICAL AND CHEMICAL SCIENCES
FIRST SEMESTER 2017/2018 B,Sc EXAMINATIONS

BCH 201- GENERAL BIOCHEMISTRY I

Time: 2 hrs

Instruction: Attempt any (4) of the six (6) questions

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 sodium hydroxide solution?
 - (ii) If 50ml of 0.32M NaOH are added to 100ml 0.2M HCl

(15 marks)

2. (a) What are buffers?
(b) Define Buffer Capacity
(c) At what point does a buffer works best?
(d) From the reaction, $HA \leftrightarrow H^+ + A^-$; Derive $pH = pK_a + \text{Log } [A^-]/[HA]$.
(e) A buffer solution contains equal concentrations of acetic acid and sodium acetate. Calculate the pH of the buffer.

(15 marks)

3. (a) Giving correct examples, write short notes on
 - (i) Epimers..... 3 marks
 - (ii) Enantiomers.....3 marks
 - (iii) Anomers.....3 marks

(b) Clearly state the similarities and differences between Amylose and Amylopectin....6 marks

4. (a) With specific examples, differentiate between
 - (i) Purines and Pyrimidines..... 3 marks
 - (ii) DNA and RNA.....3 marks
 - (iii) Monocistronic and Polycistronic gene..... 3 marks

(b) Describe
 - (i) Palindrome..... 2 marks
 - (ii) Hairpin.....2 marks
 - (iii) Cruciform.....2 marks

5. (a) State clearly the similarities and differences between enzymes and catalyst...5 marks

(b) With the aid of annotated diagrams only, describe

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- (i) Enzyme..... 2 marks
 - (ii) Substrate.....2 marks
 - (iii) Ezyme-substrate complex..... 2 marks

- (c) Briefly define any four (4) of the following:
- (i) Active site.....1 mark
 - (ii) Binding site.....1 mark
 - (iii) Activation energy..... 1 mark
 - (iv) Cofactors..... 1 mark
 - (v) Coenzymes..... 1 mark

6. (a) Classify the 20 amino acids based on the side chains attached to the α -carbon ...7 marks

(b) Illustrate with suitable diagrams and examples, the four levels of structural organization of proteins.....8 marks