ELIZADE UNIVERSITY ILARA-MOKIN
FACULTY OF BASIC AND APPLIED SCIENCES
DEPARTMENT OF PHYSICAL AND CHEMICAL SCIENCES
FIRST SEMESTER EXAMINATION 2016/2017 SESSION

BCH 407- Instrumentation and Bioanalytical Techniques **Time: 2hrs 30 minutes**

Instructions: Answer four (4) Questions in all; two from each Section. Each Question carries 15 marks.

SECTION A

1a. (i) What are the compositions of glass and reference pH electrodes?
(ii) What is calomel electrode?
(iii) With the aid of a well-labelled diagram only, illustrate a combination pH electrode
b. Describe the steps involved in making a pH measurement with a glass pH electrode and meter.

2a. (i) What is Electromagnetic Radiation?
(ii) The internal energy of a molecule is due to at least three contributing sources. What are these sources?
(iii) What is frequency? The energy associated with a particular waveform is directly related to the frequency of radiation as follows: $E = h\nu = hc/\lambda$
Define each parameter in this equation.
b. (i) State Beer's and Lambert's laws
(ii) What are the limitations of Beer-Lambert law

3a.(i) What is a Centrifuge?
(ii) State the factors affecting the rate at which particles suspended in a liquid will move.
b. (i) Write short notes on Low-speed centrifuges, High-speed centrifuges and Ultracentrifuges, including statements of their uses.
(ii) What is relative centrifugal field (RCF)? State the mathematical formula for RCF.
(iii) Calculate the RCF of a bench centrifuge with a speed of 4000 r.p.m. and radius (r) of 100mm.

SECTION B

1a. Describe the general principles of chromatographic techniques
b. Write on any one of the following chromatographic techniques
i. Paper chromatographic technique.
ii. Ion exchange chromatographic technique.
iii. Gel Filtration/Gel Permeation technique.

2. With the aid of a good diagram, describe the process of Sodium Dodecyl Sulphate Poly Acrylamide Gel Electrophoresis.

3. (a) Define the term "Fermentation".
(b) Mention five (5) types of fermentation and briefly describe three.
(c) What is the difference between a fermenter and a bioreactor?
(d). List five (5} examples of a bioreactor and describe one.