



**ELIZADE UNIVERSITY, ILARA-MOKIN, ONDO STATE,  
NIGERIA**

**BASIC & APPLIED SCIENCES  
BIOLOGICAL SCIENCES  
FIRST SEMESTER EXAMINATION  
2018/2019 ACADEMIC SESSION**

**COURSE CODE: BIO 204  
COURSE TITLE: PRINCIPLES OF BIOLOGICAL TECHNIQUES  
COURSE UNIT: 1  
DURATION: 2 HOURS**

A handwritten signature in black ink is enclosed in a rectangular box. To the right of the signature, the date '03/07/2019' is written in black ink.

**HOD's SIGNATURE**

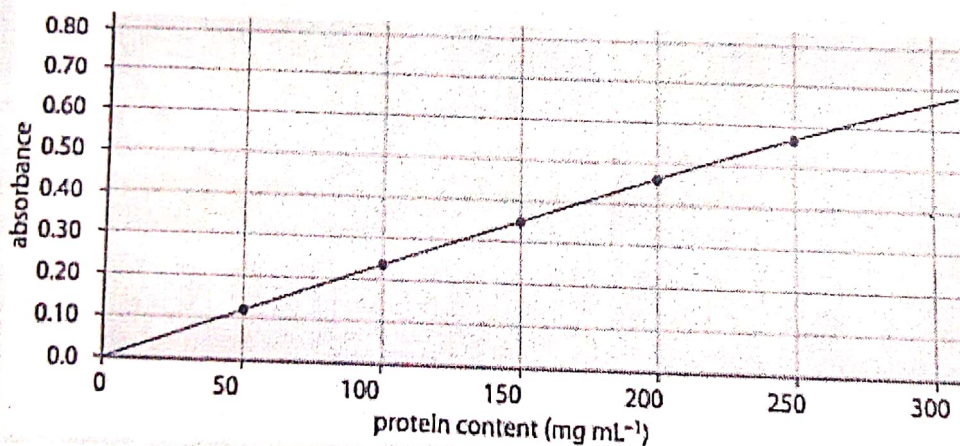
**NAME: .....**

**MAT. No. : .....**

**Instructions: Answer any three (3) questions.**

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1. (a) List different types of microscopes and their functions.  
(b) (i) A bacterial cell was viewed under a light microscope. The actual length of the cell was 4 micrometers. Calculate the magnification if the image size was 5cm?.  
(ii) If a microscope with magnification (x5000) was used to view the same bacterial cell, what size will the image appear?.  
(c) A student sketched an organism and the sketch is 5.0 cm long. The actual size of the organism was 200  $\mu\text{m}$ .  
(i) Convert 5.0 cm to mm and  $\mu\text{m}$ .  
(ii) Calculate the magnification of the drawing.
2. (a) State Beer's Lambert law.  
(b) The protein content of a sample was determined using a reagent to convert the protein into a colored complex. The absorbance of the complex was measured using a UV-visible spectrophotometer set at an appropriate wavelength. Using standard protein solutions, the calibration curve shown below was obtained. A sample containing protein was diluted 50-fold. The diluted solution was found to have an absorbance of 0.30 use.



Use the information above to answer the following questions:

- (i) What is the protein content of the sample? (ii) Convert the value to g/ml.
- (c) A solution of thickness 2 cm transmits 40 % incident light. Calculate the concentration of the solution, given that  $\epsilon = 6000 \text{ dm}^3/\text{mol}/\text{cm}$ .
3. (a) What is chromatography?  
(b) The developing solvent mixture is usually prepared fresh before use. Explain?  
(c) Describe the application of this technique to the study of plant pigments?
4. (a) What is centrifugation?  
(b) How many revolutions per minute (rpm) are needed to centrifuge a sample at 100,000 x g in a rotor with a radius 7.2 cm?  
(c) Explain the principle and applications of centrifugation.
5. (a) State three (3) important steps in experimental design.  
(b) Discuss the principles of experimental design.  
(c) List three (3) types of experimental variables.