MURANG'A UNIVERSITY COLLEGE

(A constituent college of Jomo Kenyatta University of Agriculture and Technology)

SCHOOL OF PURE AND APPLIED SCIENCE

UNIT CODE ASB
UNIT TITLE: SCIENCE
TIME: 11.00-1.00PM
DATE: 3RD AUGUST 2015

SUPPLEMENTARY/SPECIAL EXAMINATION

ANSWE ALL QUESTIONS (50 MARKS)

1. Define the following terms
   (i) Fehling solution (1 mark)
   (ii) A zwitterion (2 marks)
   (iii) fractional crystallization (2 marks)
   (iv) chemical equilibrium (2 marks)

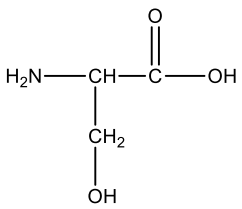
2. Write the condensed formula of the acid whose symbol formula is **18:1 (9)** (2 marks)

3. Explain why an aqueous solution of sodium hydrogen carbonate is considered an electrolyte (2marks)

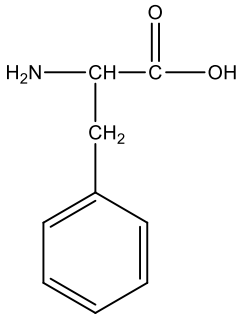
4. State one biological function of waxes in birds and one commercial application of waxes (2marks)

5. State the difference between a ketose sugar and an aldose sugar (2 marks)

6. Below are structures of two amino acids. Draw the structures of the two possible peptides formed by the two (3 marks)



serine



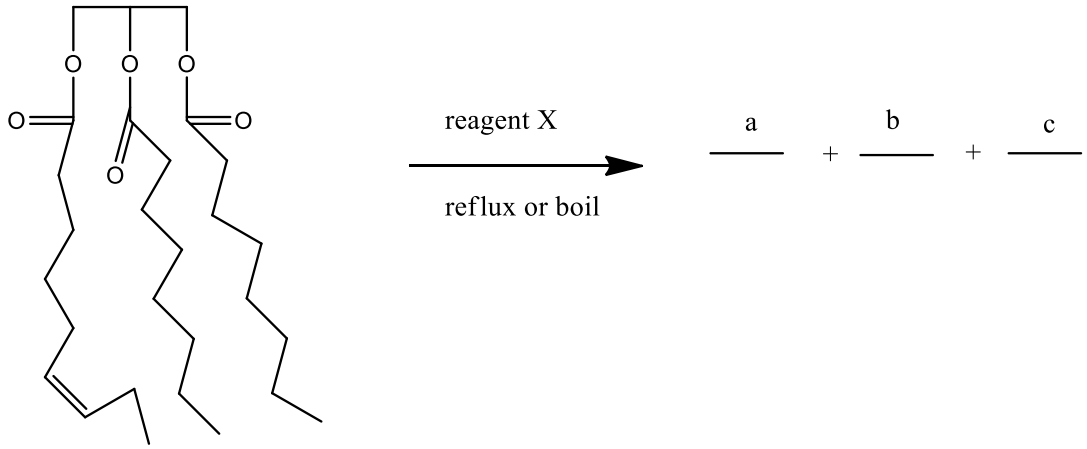
phenylalanine

7. Explain how the following can be enhanced (2 marks)
   (a) Solubility of carbon dioxide in a soft drink
   (b) Solubility of ninhydrin crystals in water

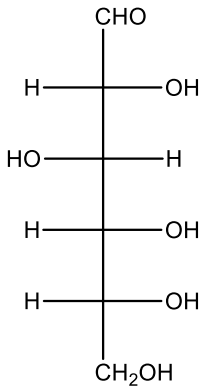
8. Calculate the total pressure in atmospheres of a gas mixture that contains 1.0g Hydrogen H_2 and 8.0g Argon Ar in a 3 litre container at 27 ^{0}C. What are the partial pressures of the two gases (3marks)

9. Using a diagram explain how the boiling point of ethanol is elevated when sugar crystals are dissolved into it. (3 marks)

10. In the hydrolysis reaction below draw the structure s of the three products **a, b, c** and identify reagent **X** (3 marks)



11. Draw the Harworth projection of for the glucose molecule represented below by a Fischer projection (3 marks)



12. Explain how one can prepare a saturated solution of NaCl (2 marks)

13. Compare the effusion of carbon monoxide and oxygen under similar temperature and pressure conditions. (2 marks)

14. Explain why pure water cannot be used for intravenous rehydration (2marks)

15. State any two characteristics that distinguish colloids from other types of mixtures (2 marks)

16. 7.68mg of unknown hydrophobic vitamin was dissolved in chloroform to form a 10mL solution. And the osmotic pressure of the solution was found to be 26.57mmHg at 25^{o}C. [$\pi = cRT$ and R = 0.08206 L. Atm/mol. K]
    (a) Calculate the concentration of the vitamin (2 marks)
    (b) Calculate the moles of vitamin present in 10mL (2 marks)
    (c) Calculate the molar mass of the vitamin (2 marks)
    (d) Why is chloroform used and not water (1 mark)

17. State three factors that can influence the rate of a chemical reaction (3 marks)

END