Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
300 Level First Semester Examination – Sep/Oct 2015
SCT 319-2 Instrumental Methods in Biology

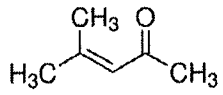
Uva Wellassa University

Number of questions: Four (04)
Answer all questions.
Number of pages: Two (02)
Time allocation: Two (02) hours
Total marks allocated: 100 marks

1.

a. What are the main types of molecular orbitals? Arrange the electronic transitions occur between these molecular orbitals in the order of lowest energy to highest energy required. (05 Mark)

b. Explain the possible electronic transitions occur in the molecule 4-methyl-3-penten-2-one showing an energy diagram.



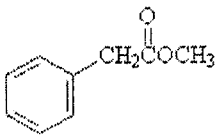
(10 Mark)

c. Compare the bathochromic shift and hypsochromic using examples (10 Mark)

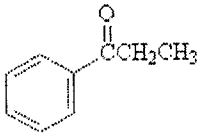
2.

a. Which molecule out of CO and N_2 absorbs energy from IR region? Justify your answer. (07 Mark)

b. In a laboratory, there are two chemical bottles of which the labels are missing. However, it knows that each bottle contains the following compounds, A and B, separately.



A



B

30

Explain how you would identify these chemicals using their corresponding IR spectra? (08 Mark)

c. Briefly describe how you would determine the amount of compound A in a given sample containing a mixture of compounds A and B (shown in question 2. b.) by an IR spectroscopy analysis. (10 Mark)

3.

a. Compare the excitation processes used in flame photometry and flame atomic absorption spectroscopy. (10 Mark)

b. What is the role of photomultiplier tube in the atomic absorption spectrometer? (07 Mark)

c. Describe how the water content in a gelatin sample is determined by using thermo-gravimetric analysis. (08 Mark)

4.

a. Sketch a mass spectrometer designating its main components. What action should be made to analyze the highest deflected ions and least deflected ion in the operation of the mass spectrometer? (08 Mark)

b. What pattern of peaks in their mass spectra would confirm the presence of chlorinated compounds? Explain your answer. (07 Mark)

c. Describe the use of relevant standards in identifying the components in a given sample by gas chromatography. (10 Mark)