

CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Semester 1 Examinations 2009/10

Module Title: Applied Separation Technology

Module Code: BIOM8001

School: School of Science

Programme Title: Bachelor of Science (Honours) in Herbal Science
 Bachelor of Science (Honours) in Nutrition and Health Science

Programme Code: SHERB_8_Y3
 SNHSC_8_Y3

External Examiner(s): Prof. E. Williamson, Dr. D. Clare
Internal Examiner(s): Mr. G. Levieille

Instructions: **Answer any 4 of the 6 questions asked. Each question carries a equal mark weighing of 25%. Please state clearly the questions addressed in your paper.**

Duration: 2 hours

Sitting: Winter 2009

Requirements for this examination:

Note to Candidates: Please check the Programme Title and the Module Title to ensure that you have received the correct examination paper.
If in doubt please contact an Invigilator.

- Q1.** You want to separate plant debris from a macerate. What are the methods available to achieve this task? Discuss the advantages and limitations of each of the methods.
- Q2.** Separations by reverse osmosis and by nanofiltration can be considered to achieve similar levels of separation. Discuss the differences, similarities and relative advantages of these two methods.
Which method would you choose to remove salt from a protein solution? Why?
- Q3.** Discuss the liquid-liquid separation method for the recovery of natural products. How would you choose the solvents used?
- Q4.** Supercritical fluid extraction can be used to extract volatile compounds such as essential oils. How does it work? Why would you choose to apply it instead of distillation?
- Q5.** Two substances A and B are separated by column chromatography. Their retention times are A: 4.5 min and B: 12.4 min, on a 25 cm column. The widths of the peak bases were 0.45 and 0.75 min respectively.
Calculate: *(a.) column resolution (b.) the average number of plates in the column (c.) the plate height (d.) the length of column sufficient to achieve a resolution of 2 (e.) the retention time required to achieve a resolution of 2.*
- Q6.** How would you choose an HPLC method of quantification of a known natural compound in an extract? Indicate the factors to consider to optimise the method and detail the steps you would take to proceed in your optimisation.