



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF APPLIED CHEMISTRY
BACHELOR OF SCIENCE HONOURS DEGREE
END OF SECOND SEMESTER EXAMINATIONS – AUGUST 2009
CHROMATOGRAPHIC SEPARATIONS – SCH 4292
TIME: 3 HOURS

INSTRUCTIONS TO CANDIDATES

Answer **ANY FOUR** questions. Each question carries 25 marks.

SECTION A

1. (a) Define the following terms as used in chromatography
- (i) Isocratic elution. [2 marks]
 - (ii) Gradient elution. [2 marks]
 - (iii) Temperature programming. [2 marks]
 - (iv) Column resolution. [2 marks]
 - (v) Plate height. [2 marks]
- (b) Give a detailed comparison between TLC and HPTLC. [8 marks]
- (c) What would be the effect of the following on the plate height of a column? Explain.
- (i) reducing the particle size of the packing. [4 marks]
 - (ii) increasing the flow rate. [3 marks]
2. (a) Describe how the following detectors used in Gas Chromatography function.
- (i) Flame ionisation. [5 marks]
 - (ii) Thermal Conductivity. [5 marks]

- (iii) Electron Capture. [5 marks]
- (b) Discuss the advantages and disadvantages of using Gas Chromatography in quantitative analysis. [10 marks]
3. (a) What is the packing material used in most packed Gas Chromatography column? [10 marks]
- (b) What are megabore open tubular columns, why are they used? [10 marks]
- (c) What are the advantages of fused-silica capillary columns as compared with glass or metal columns. [5 marks]
4. What is the difference in properties and roles of mobile phases in gas and liquid chromatography. How do these difference influence the characteristics of the two methods. (25 marks)
5. (a) Write the van Deemeter equation. [2 marks]
- (b) Explain how each term affects zone broadening. [13 marks]
- (c) Why is there more zone broadening with gas chromatography than with supercritical fluid chromatography? [10 marks]

End of question Paper!!!