



**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**DEPARTMENT OF APPLIED CHEMISTRY**  
**BACHELOR OF SCIENCE HONOURS DEGREE**  
**END OF FIRST SEMESTER EXAMINATIONS – MAY 2009**  
**ANALYTICAL CHEMISTRY III – SCH 4206**  
**TIME: 3 HOURS**

**INSTRUCTIONS TO CANDIDATES**

Answer **Any Four** questions. Each question carries 25 marks. Total marks is 100.

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1.
  - (a) Describe the source of error in decomposition and dissolution of samples. Please give practical examples. (10 marks)
  - (b) Explain why microwave digestion is more efficient than conventional methods. (10 marks)
  - (c) What is the significance of an accurate sample preparation technique? (5 marks)
  
2.
  - (a) What is the difference between sorbed water, adsorbed water and occluded water? (9 marks)
  - (b) What fluxes are suitable for the determination of alkali metal silicates? (8 marks)
  - (c) What are the disadvantages of using fluxes? (8 marks)
  
3.
  - (a) In analytical chemistry, what is an interferent and how is it dealt with? Give practical examples in your explanations. (15 marks)
  - (b) Describe any two classical separation techniques, also indicate their drawbacks. (10 marks)
  
4. For super critical fluid extractions, differentiate between:
  - (a) On-line and off-line processes (15 marks)
  - (b) Static and dynamic extractions (10 marks)
  
5. Give a brief description of the following membrane filtration techniques.

- (a) Dialysis (7 marks)
- (b) Ultra filtration (6 marks)
- (c) Micro filtration (6 marks)
- (d) Reverse osmosis (6 marks)

6. The protection of our environment should be at the back of the mind of every analytical chemist. What are the qualities of the methods that are used in the analysis of any one of the following samples for trace elements?

- (a) Effluent water
- (b) Salt samples
- (c) Tree leaves taken from area next to a gold mine dump site.

Your answer should relate to sample treatment, instrumentation used and the impact on the environment.

(25 marks)

*End of question Paper!!!*