UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA

FIRST SEMESTER EXAMINATIONS, NOV/DEC 2018

COURSE NO: MR 473
COURSE NAME: ENV. CHEM. & MAN. OF MINE WASTE WATER
CLASS: MR IV **TIME**: 2 HOURS

Name**:** _____Index Number: _____

ANSWER ALL QUESTIONS

Q1a

Explain the following terms [**20 marks**]

- **(i)** Environmental chemistry
- **(ii)** Environmental matrices
- **(iii)** Watershed
- **(iv)** Point source
- **(v)** Non-point source
- **(vi)** Chemical transport
- **(vii)** Fate of chemicals
- **(viii)** Importance of chemical transport and fate
- **(ix)** Hydrosphere
- **(x)** Atmosphere

Q1b

- **(i)** State and explain the main chemical fate processes. Given an example in each case. [1**2 marks**]
- **(ii)** State and explain the main chemical transport processes [**10 marks**]
- **(iii)** List the agents responsible for chemical transport processes [**8 marks**]

Q2a

- **(i)** What is acid mine drainage (AMD)? [**5 marks**]
- **(ii)** State the sources of AMD [**5 marks**]
- **(iii)** State the chemical characteristics of AMD water [**5 marks**]
- **(iv)** State the key indicators of AMD [**5 marks**]
- **(v)** State and explain the ways to prevent/minimise AMD [**10 marks**]

Q2b

A mine water sample, at **25^0C**, has **Eh = 0.8** and **pH = 5**. Assuming the systems is at equilibrium, calculate the amount of dissolved oxygen in the mine water sample. [**10 marks**]

Q2c

- **(i)** What are mine waters? [**5 marks**]
- **(ii)** State and explain three (3) types of mine waters [**6 marks**]
- **(iii)** List the different forms of classifying mine waste waters [**6 marks**]
- **(iv)** State and explain three main applications of Eh-pH diagram [**12 marks**]
- **(v)** List the short-comings associated geochemical classification of mine waters based on the amount of dissolved metals and pH. [**6 marks**]

*Examiners: **Dr E. A. Agorhom**/Prof R. K. Amankwah*