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UNIVERSITY OF GHANA

BSc. FIRST SEMESTER EXAMINATIONS: 2017/2018

DEPARTMENT OF CHEMISTRY

CHEM 493: MINERAL PROCESSING (2 CREDITS)

INSTRUCTIONS: ***Answer <u>All questions</u>.***

TIME ALLOWED: TWO (2) HOURS

1.

a) In froth flotation, what are direct flotation and reverse flotation?

b) For froth flotation, minerals are classified into polar and nonpolar types.

i. Give two examples of nonpolar minerals

ii. Name the various classes of polar minerals

c) Briefly describe the main functions, and principles, of

i. Collectors

ii. Frothers

iii. Regulators

2.

a) In one sentence give the principle behind Dense Medium Separation.

b) Why is water containing a suspension of some dense solid particles used as heavy liquid in dense medium separation?

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c) Why is it necessary to use fine high specific gravity solid particles in dense medium separation?

3.

a) What does the use of gravity concentration aim to achieve?

b) When does gravity concentration become relatively easy? Give one example of such separation.

c) Define concentration criterion, $\Delta\rho$.

i. For the separation of quartz and galena with water as the fluid medium, calculate the concentration criterion. The specific gravity of quartz is 2.6 and that of galena is 7.4.

ii. Is it possible to separate these two minerals? Explain.

4.

a) An iron ore was recently discovered in the Central region of Ghana. Analysis of the ore gave an iron concentration of 5.00% in it. What is the concentration of pyrite (FeS_2)?

b) A sample was found to contain three phases, chalcopyrite ($CuFeS_2$), Pyrite (FeS_2), and other minerals containing no sulfides (i.e. no Cu or Fe). The Cu concentration was determined to be 23.6% and that of Fe was 24.7%. What is the concentration of the pyrite?