



PROGRAM

B ENG. TECHNOLOGIAE
EXTRACTION METALLURGY

SUBJECT

INDUSTRIAL MINERALS 4

CODE

INNMTB3

DATE

SUPPLEMENTARY EXAMINATION
DECEMBER 2019

DURATION

(SESSION 1) 08:30 - 11:30

WEIGHT

40 : 60

TOTAL MARKS

100

ASSESSOR

Ms MAPILANE MADIBA

MODERATOR

Mr OSCAR CHAUKE

NUMBER OF PAGES

4 PAGES AND A 2-PAGE ANNEXURE

INSTRUCTIONS

- First read carefully through all questions; only then
- Answer all questions in any sequence – but
- Please start answering each question on a new page
- Calculators are permitted

QUESTION 1 **[22]**

Specific processes

- 1.1 Which (simple) method is applied to concentrate asbestos fibers and vermiculite flakes? (4)
- 1.2 Which raw materials are required to make cement? What compound is the most important constituent in cement and how is it produced? Formulate the setting of cement? (8)
- 1.3 Why is 'fluorspar' called 'fluorspar'? Indicate three different product qualities of fluorspar and relate these to applications. (8)
- 1.4 What do you think is the beneficial effect of adding fluorspar to metallurgical slag? (2)

QUESTION 2 **[20]**

Heavy Sand Minerals

You are employed by Richards Bay Minerals (RBM). Explain by using a flowsheet the different major steps.

QUESTION 3 **[12]**

Diamonds

If used for jewellery, diamonds are valued according to the 4 'Cs'. Which are they and what aspects do the 'Cs' address?

QUESTION 4 **[11]**

You are a Mintek's employee and are presenting the new process developed by Mintek Pyrometallurgy division. An attendant does not see any substantial difference between the Pidgeon process and the Mintek process. Explain thermodynamically the differences and similarities between the two processes

QUESTION 5 **[15]**

Vanadium oxide

Explain why vanadium is a good alloying element and why is it preferred to niobium? Be specific.

QUESTION 6

[20]

Ferrosilicon

You are required to produce ferrosilicon. Discuss a way forward how you would handle the process and what is the mechanism (expected reactions) of ferrosilicon production. What are the main parameters that one would manipulate in order to make the process efficient?

TOTAL = 100
