



FACULTY OF ENGINEERING AND THE ENVIRONMENT

DEPARTMENT OF MINING ENGINEERING

ATMOSPHERIC ENVIRONMENTAL CONTROL AND MINING

EMI 3205

Final Examination Paper

August 2021

This examination paper consists of 2 pages

Time Allowed: 3 hours

Total Marks: 100

Examiner's Name: Miss M. Kanganga

INSTRUCTIONS

1. This question paper consists of 4 questions

Question 1 is compulsory

Answer any other TWO from question 2 to 4

2. Questions 2 to 4 carry 25 marks each

3. Answer each question on a new page and write as eligible as possible

Additional Requirements

None

Question 1

- a) Explain how local exhaust ventilation systems (LEVs) function and state the advantages of LEVs [10]
- b) State the five typical dust producing areas and explain their dust production mechanism. [10]
- c) Differentiate between particulate matter, fugitive dust and gaseous waste and explain how the standards TSP and PM_{10} affect their control. [10]
- d) Differentiate between primary and secondary ambient air quality standards and give an assessment of how the general Zimbabwean community can benefit from these standards as well as how the mining industry can reduce its pollutant footprint locally, regionally and globally from application of the stated standards. [20]

Question 2

- a) Comparing hoods and blowing versus exhaust ventilation, there are ventilation principles that underscore how critical it is for an effective hood design to be very close to the dust generation source. Explain the statement above. [10]
- b) Explain why
 - a. The most effective hood design should encompass the entire dust generation process [4]
 - b. At certain instances capture hoods are used [3]
 - c. It is critical that makeup air drawn past a worker before entering an exhaust hood be essentially dust-free [4]
 - d. Flanges on hoods should be used [4]

Question 3

- a) In drilling and blasting, damaged, nonfunctional, or missing dust collector filters are generally the root cause of dust exhaust air from the collector. Outline and give brief notes on the three areas of vulnerability that have been identified to be related to dry dust collection and their dust control measures respectively. [15]
- b) Considering the dust samplers and sampling strategies, how do you perform sampling to quantify respirable dust generation in coal mining? [10]

Question 4

- a) Compare and contrast between management and engineering approaches to dust management, highlighting effectiveness of each approach. Is it necessary to have both systems in a company? Explain your answer. [25]

End of Exam