



Chamber of Mines of South Africa

EXAMINATION PAPER

SUBJECT: CHAMBER OF MINES OF SOUTH AFRICA – CERTIFICATE IN MINE ENVIRONMENTAL CONTROL PAPER 5 SUBJECT CODE: COMMEC5 EXAMINATION DATE: 16 OCTOBER 2017 TIME: 14:30 – 17:30	EXAMINER: Ms. S Wheeler MODERATOR: Prof C Badenhorst TOTAL MARKS: [100] PASS MARK: (60%)
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NUMBER OF PAGES: 5

SPECIAL REQUIREMENTS:

THIS IS NOT AN **OPEN BOOK EXAMINATION**. **FORMULA HANDOUTS ARE ALLOWED.**

INSTRUCTIONS TO CANDIDATES:

1. Answer all questions **legibly** in English.
2. Write your **ID number** on the outside cover of each book used and on any graph paper or other loose sheets handed in.

NB: Your name **must not** appear on any answer book or loose sheets.

3. Show all calculations **and check calculations on which the answers are based.**
4. Hand-held electronic calculators may be used for calculations.
5. Write **legibly** in ink on the **right hand page** only – **left hand pages will not be marked.**
6. Illustrate your answers by means of sketches or diagrams wherever possible.
7. Answers must be given to an accuracy which is typical of practical conditions.

NB Ensure that the correct unit of measure (SI unit) are recorded as marks will be deducted from answers if the incorrect unit is used. (even if the calculated value is correct).

8. In answering the questions, full advantage should be taken of your practical experience as well as data given.
9. Please note that you are not allowed to contact your examiner or moderator regarding this examination.
10. Cell phones are **NOT** allowed in the examination room.

QUESTION 1

- 1.1 A fan is located in the centre of a large flat area free of obstructions. Measurements taken on the surface of an imaginary hemisphere of radius 5 meter centred at the fan indicated sound pressure of 0.8Pa.
- Indicate all assumptions made and calculate:
- 1.1.1 the sound pressure level on the surface of the hemisphere, and
 - 1.1.2 the sound power level of the fan. **(10)**
- 1.2 Describe, with the aid of a simple sketch, the anatomy of the human ear. **(4)**
- 1.3 Describe the physiology of: **(6)**
- 1.3.1 The outer ear
 - 1.3.2 The middle ear
 - 1.3.3 The inner ear

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QUESTION 2

2.1 List four (4) symptoms of fatigue and four (4) causes giving rise to fatigue. **(8)**

2.2 List four (4) physiological effects of exposure to vibration **(4)**

2.3 List three (3) considerations for the optimal design of working conditions with regard to worker well-being, performance, safety and health. **(3)**

2.4 Define the condition “Sick Building Syndrome” and list three (3) symptoms associated with this syndrome. **(5)**

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QUESTION 3

3.1 Define the following terms (5)

3.1.1 Atelectasis

3.1.2 Inspiratory capacity

3.1.3 Nystagmus

3.1.4 Teratogens

3.1.5 Anthropometry

3.2 List four (4) factors that you would consider when designing illumination systems. (4)

3.3 List six (6) factors that can affect skin absorption rate (3)

3.4 What do the following acronyms stand for? (5)

3.4.1 NNR

3.4.2 TWARQC

3.4.3 MOHAC

3.4.4 HEG

3.4.5 LC₅₀

3.5 List three (3) methods of testing noise-producing appliances (3)

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QUESTION 4

- 4.1 How much fresh air containing 0.45mg/m^3 of dust should be mixed with $14.6\text{m}^3/\text{s}$ of air containing 2.30mg/m^3 of dust to reduce the dust concentration to 1.5mg/m^3 ? (6)
- 4.2 Name the two ways hazardous chemical substances may be classified. (2)
- 4.3 List the sixteen headings that apply on a Material Safety Data Sheet (8)
- 4.4 Dust control is based on a threefold approach, name and briefly describe each of the approaches. (9)

[25]**QUESTION 5**

- 5.1 Summarise an Occupational Health programme by means of a flow chart. (15)

TOTAL MARKS: [100]