

Minerals Council South Africa



EXAMINATION PAPER

SUBJECT: CHAMBER OF MINES OF SOUTH AFRICA: INTERMEDIATE CERTIFICATE IN MINE ENVIRONMENTAL CONTROL PAPER 1 SUBJECT CODE: COMIMEC1 EXAMINATION DATE: 10 OCTOBER 2025 TIME: 14:00 to 17:00	Examiner: Mervin van Rooyen Moderator: Inus Labuschagne TOTAL MARKS: [100] PASS MARK: [60%]
NUMBER OF PAGES: 3 (including this one)	
EXAMINATION INSTRUCTIONS: <i>All candidates are advised to read the below instructions/requirements and adhere to them. Not adhering to them could lead to the loss of marks.</i> THIS IS NOT AN OPEN BOOK EXAMINATION. THERE IS NO FORMULA HANDOUT 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, diagrams and tables 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 in the calculations 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. 11. You are encouraged to make use of the CoMCert Tip-off Hotline whenever you witness or suspect any wrongdoing related to the CoMCert Examinations on landline 0800 118 998 or alternatively you can use email COMCert@tip-offs.com. This tip-off hotline and tip-off email is managed anonymously and confidentially through an independent service provider.	

QUESTION 1

- 1.1 Draw and label the Four Gate System used to ventilate a shaft sinking operation and describe the principle of operation of the system. (10)
- 1.2 During routine workplace observations, Sub-Standards on Environmental Control are recorded. What remedial action must be taken by yourself? (10)

[20]**QUESTION 2**

- 2.1 During the monitoring program of an underground fire, a number of measurements are to be taken and plotted on a graph to determine the trend of the fire. List the measurements and give a brief summary of the measurements. (10)

[10]**QUESTION 3**

- 3.1 Draw a layout of a Vapour Compression Refrigeration Cycle used on the mines. (10)

[10]**QUESTION 4**

- 4.1 A hoist motor gives off 310kW as heat and the motor is 87% efficient. Calculate the hoist motor input power and output power. (8)
- 4.2 Determine the pressure required to overcome friction when $60\text{m}^3/\text{s}$ of air flow along a $4,0\text{m} \times 3,0\text{m}$ rock tunnel, 1500m long at a density of $1,35\text{kg}/\text{m}^3$. (6)
- 4.3 Calculate the friction of a haulage in which $57,2\text{m}^3/\text{s}$ flow at a pressure loss of 250Pa. The length of the haulage is 170m and is $2,5 \times 3,0\text{m}$. The prevailing density is $1,15\text{kg}/\text{m}^3$. Is this a rock lined or heavily supported airway? (6)

[20]**QUESTION 5**

- 5.1 In table form, compare the advantages and disadvantages of Axial Flow Fans and Centrifugal Fans. (5)
- 5.2 A fan handles $4\text{m}^3/\text{s}$ at 800Pa. The electrical input power to the fan motor is 5,0kW. The motor output power is 4,5kW. The fan input power is 4,0kW. (15)

Calculate:

- I. The motor efficiency
- II. The drive efficiency
- III. The fan efficiency
- IV. The overall efficiency

[20]

QUESTION 6

- 6.1 $68\text{m}^3/\text{s}$ of air flows in a rock-lined haulage, $3,5\text{m} \times 3,2\text{m}$ in size. The specific volume is $0,893\text{m}^3/\text{kg}$. The haulage length is 257m long.

Calculate:

- | | |
|--------------------------|------|
| I. The velocity pressure | (9) |
| II. The total pressure | (11) |
| | [20] |

TOTAL MARKS: [100]

MEC Intermediate Paper 1 - October 2025