

FOUNDATION SKILLS TEST

Learner details	
Learner first name	
Learner last name	
Phone / email	
Name of assessment	Foundation Skills Test
Course	Ventilation Management Course

Learner declaration	
<p>By signing here, I declare:</p> <ul style="list-style-type: none">• The work submitted/completed by me in this assessment is and/or will be entirely my own except where the words or ideas of the other writers are specifically acknowledged.• No part of this assessment has been or will be written and/or carried out for me by any other person except where such collaboration has been authorised by the assessor concerned.• I have read and understand information contained in the Performance Training Student Handbook in relation to privacy, equity and diversity, assessment policies (including the grading process, re-assessment processes, recognition of prior learning, and plagiarism), language, literacy and numeracy assistance, special needs requirements and support, and the academic appeals process.• I understand and consent to my personal information being collected and used by Performance Training in accordance with its Privacy Policy as amended from time to time.• I make this statement in full acknowledgement of and understanding that, should it be found to be false, I will be subject to disciplinary action, including possibly being withdrawn from the course.	
Signature	Date of signature

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General instructions to learner about this assessment

1. Write your name on the first page.
2. Read all questions in this assessment prior to starting.
3. If you have a question about the assessment, please ask your assessor.
4. You must sign the Learner Declaration on page 1 prior to submitting this assessment. We cannot mark your work without a signed declaration.

Purpose of this assessment

The purpose of this assessment is to assess your foundation skills against the required skills set out in the table below, and to prepare a support plan if necessary.

Area	Foundation skills
Reading	Identifies and interprets relevant information from workplace procedures, documentation and legislation
Oral communication	Listens actively
Writing	Prepares specific information that complies with a range of requirements, using sector-specific vocabulary, grammatical structures and conventions
Numeracy	Calculates resourcing requirements Performs mathematical calculations Applies mathematical and scientific laws and theorem

Questions - Reading

Read this extract from the legislation and answer the questions

Mines Safety and Inspection Act 1994
Preliminary Part 1

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safety and health representative means a safety and health representative elected under section 56;

self-employed person means an individual who works for gain or reward otherwise than —

- (a) under a contract of employment; or
- (b) as an apprentice,

whether or not the individual is an employer;

senior inspector means a person who is a district inspector and has been appointed by the State mining engineer as the senior inspector responsible for all, or a specified part, of the State;

shaft means —

- (a) a vertical or inclined development opening into or within a mine through which persons and materials are raised and lowered using winding engines and through which services including ventilation may be provided; and
- (b) a vertical or inclined development opening into or within a mine used for ventilation,

but does not include a winze constructed from the surface or an underground level which may be used temporarily for the raising and lowering of persons or materials unless, in the opinion of an inspector, the winze is used as a shaft;

special inspector means a special inspector of mines appointed under section 17 in accordance with section 18;

State coal mining engineer means the State coal mining engineer appointed under section 16;

State mining engineer means the State mining engineer appointed under section 16;

supervisor in relation to underground mining operations or to a quarry, means a person who has the immediate supervision of employees and the direction of mining operations under the control of an underground manager, underground superintendent, quarry manager, or foreman;

supply, in relation to any plant or substance, includes supply and re-supply by way of —

- (a) sale (including by auction), exchange, lease, hire, or hire-purchase, whether as principal or agent; and
- (b) the disposal in a manner referred to in paragraph (a) of assets of a business that include any plant or substance; and
- (c) the disposal of all of the shares in a company that owns any plant or substance;

trade union means —

- (a) an organisation registered under section 53 of the *Industrial Relations Act 1979*; or
- (b) an organisation registered under the *Industrial Relations Act 1988*¹ of the Commonwealth and having employees as some or all of its members, or a branch of such an organisation;

Tribunal has the meaning given by section 51G(2) of the *Occupational Safety and Health Act 1984*;

tunnel or **adit** means a horizontal or moderately graded development opening into a mine through which persons and materials are transported and services, including ventilation, are maintained, or any combination of these functions or services is maintained;

underground in relation to mining operations, means any operations beneath the natural surface of the earth which are covered overhead by natural rock or earth, or by any earth, rock, fill, timber, or other material placed in the course of mining operations, and includes tunnels, drifts, shafts, and winzes that are used in mining operations and are more than 2 metres deep sunk from the surface;

underground manager means the person who has, under the general direction and control of the registered manager, the immediate direction and control of the underground operations of a mine;

- 1. Under the legislation (above), if the opening through which ventilation services come into a mine is close to horizontal, is it considered a shaft or a tunnel?**

Select one (1) answer only

- ☐ Shaft
- ☐ Tunnel

- 2. Under the legislation (above), who is higher in authority?**

Select one (1) answer only

- ☐ Underground manager
- ☐ Registered manager

Mines Safety and Inspection Regulations 1995
Ventilation and control of dust and atmospheric contaminants **Part 9**

r. 9.5

- (a) be trained in the sampling and assessment of atmospheric contaminants; and
- (b) demonstrate to the satisfaction of the manager or principal employer that the person is competent to perform the duties of that position.

9.5. Duties of ventilation officer — underground

A ventilation officer for an underground mining operation is responsible for —

- (a) regularly inspecting and testing workplaces, travelways, and locations where persons may travel in the mine to determine whether —
 - (i) atmospheric contaminants in the mine are maintained at levels as low as can reasonably be achieved; and
 - (ii) the mine ventilation system is providing adequate ventilation flows through those areas;and
- (b) at 3 monthly intervals and after any substantial change to the primary ventilation circuits and volume flows, determining and recording the quantity and quality of ventilating air in the mine using correct procedures and using instruments and equipment suited to that purpose; and
- (c) operating, calibrating and maintaining any metering or monitoring device used to determine the levels of emission of toxic or other atmospheric contaminants from any plant or equipment at the mine; and
- (d) ensuring that all atmospheric contaminant sampling requested by an inspector is carried out and is recorded and reported accurately, within the time required and in the manner provided in this Part; and
- (e) reading and recording the wet and dry bulb temperatures of all workplaces in the mine where it is suspected that

Mines Safety and Inspection Regulations 1995

Part 9 Ventilation and control of dust and atmospheric contaminants

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temperatures or humid conditions may have potential for adverse effects on the safety and health of persons in those workplaces; and

- (f) correctly selecting and positioning auxiliary fans, regulators and other controls, if required to ensure that the required volumes of air are provided in workplaces at the mine to satisfy the requirements of this Part; and
 - (g) having the pressure and volume readings of primary fans used in ventilating the mine taken and recorded at intervals not exceeding 3 months; and
 - (h) having ventilation plans of the mine updated at intervals not exceeding 3 months, and ensuring that the current ventilation and survey information is immediately available on special plans maintained for the use of rescue teams in the event of an underground emergency; and
 - (i) reporting promptly to the manager or the manager's representative —
 - (i) any defect or deficiency of which the ventilation officer is aware in the ventilation at the mine; and
 - (ii) any atmospheric contaminant level in a workplace at the mine that exceeds the exposure standard;
- and
- (j) entering in the ventilation log book all records required under this Part to be entered in that book, and ensuring that each complete entry is dated and signed; and
 - (k) providing technical advice and guidance to any technician employed to assist the ventilation officer.

[Regulation 9.5 amended: Gazette 19 Jan 1996 p. 237.]

9.6. Duties of ventilation officer — surface mining operations

A ventilation officer for a surface mining operation is responsible for —

- (a) regularly inspecting and testing workplaces, travelways, and locations where persons may travel at the mine to determine whether atmospheric contaminants at the mine are maintained at levels as low as can reasonably be achieved; and
 - (b) ensuring that any sampling of atmospheric contaminants requested by an inspector is carried out and recorded and reported accurately, within the time required and in the manner provided in this Part; and
 - (c) examining, and reporting on, the means and effectiveness of dust suppression or dust collection devices and systems at the mine; and
 - (d) operating, calibrating and maintaining any metering or monitoring device used to determine the levels of emission of toxic or other atmospheric contaminants from any plant or equipment at the mine; and
 - (e) reporting promptly to the manager or the manager's representative —
 - (i) any defect or deficiency of which the ventilation officer is aware in the ventilation system at the mine; and
 - (ii) any atmospheric contaminant level in a workplace at the mine that exceeds the exposure standard;
- and
- (f) entering in the ventilation log book all records required under this Part to be entered in that book, and ensuring that each complete entry is dated and signed.

3. Under the regulations (above), who is responsible for correctly positioning auxiliary fans and regulators?

Select one (1) answer only

- ☐ A surface ventilation officer
- ☐ An underground ventilation officer
- ☐ Both surface and underground ventilation officers

4. Under the regulations (above), what does the ventilation officer have to read and record if it is suspected that temperatures or humid conditions may have an adverse effect on health and safety?

Select one (1) answer only

- ☐ Wet bulb temperature
- ☐ Dry bulb temperature
- ☐ Wet or dry bulb temperature
- ☐ Wet and dry bulb temperatures

Read this extract from a Standard Operating Procedure and answer the question

8) Acclimatisation

Ensure personnel working at or visiting the underground or other associated mining areas are acclimatised to their working environment.

Acclimatisation refers to the body adjusting to changes in environment.

9) Modifying work

- No person will work in an area above 30°C Wet Bulb for longer than one (1) hour without a suitable break in a cool location.
- Any work done is to be on a work-rest regime. This is to be established between those in the ambient environment and the supervisor and is to take account of the level of work being done, e.g., light, moderate or heavy work.
- As a guideline a 50% work – 50% rest regime would mostly be suitable, but this may vary due to the type of work being done.

The aim of this form of modified work is for all employees to be aware of the problems of working in hot conditions, to take responsibility for their own safety and be used to pacing themselves when working in hot conditions.

10) Stop work

- If the measured Wet Bulb in an area is 32°C, then:
 - all persons performing work in that area are to be withdrawn immediately; and
 - the only work that may be done in that area is work performed specifically to remedy the lack of ventilation, and that work must be done subject to these conditions:
 - The work must be done under the direct supervision of the supervisor.
 - Persons must only do such work in these areas for a maximum of six (6) hours and following a suitable work-rest cycle that is dependent on the person doing the work and the work being done.
 - If the work is not finished within six (6) hours, then that worker is to cease working on the task and other crews are to be used.
 - No other work may be done in the area until the wet bulb temperature falls back below the Stop Work Level.

11) Criteria for Working Conditions

Standard Criteria where the Air velocity ≥ 0.75 m/s and $t_{0.5} = t_{WB} + 5^{\circ}\text{C}$

Conditions	Wet Bulb Temperature ($^{\circ}\text{C}$)	Equivalent Cooling Power * (W/m^2)	DESCRIPTION
Optimum	27	200	Optimum working conditions for safety and productivity.
Caution	28<30	185	Conditions are moving away from optimum.
Modified Work	30<32	140	Lower limit for sustaining light work continuously. Modified work conditions to apply.
Stop Work	≥ 32	115	Work to Stop

5. Under the standard operating procedure (above), how long may the ventilation officer spend conducting a quantity survey where Wet Bulb temperature is 33°C?

Select one (1) answer only

- ☐ No longer than one (1) hour without a break in a suitable cool location
- ☐ No longer than six (6) hours, providing they are supervised and take regular breaks
- ☐ The ventilation officer cannot work in the area for this purpose until the temperature drops back below the Stop Work Level

Questions - Oral communication



Listen to the news report about North Parkes' mining disaster and answer the questions below.

Link: https://youtu.be/Vqgx_ktRs5I

6. According to the news report (above), at what type of mine did this incident occur?

Select one (1) answer only

- ☐ Gold
- ☐ Gold and copper
- ☐ Copper
- ☐ This was not reported

7. According to the news report (above), what appears to have caused the death of these miners?

Select one (1) answer only

- ☐ Windblast – cause unknown
- ☐ Windblast caused by ore body collapsing
- ☐ It is still under investigation
- ☐ This was not reported

Questions – Writing

8. Complete the extract of Incident report below

*Write a description of the incident, using information from the news report about the North Parkes disaster.
Use appropriate language, and mining-specific terminology.*

Details of incident	
Date of incident	24 November 1999
Description of incident	

Questions – Numeracy

9. A mine employs five (5) loaders each requiring a ventilation rate of $15\text{m}^3/\text{s}$, and eight (8) haul trucks each requiring a ventilation rate of $30\text{m}^3/\text{s}$.

What is the total ventilation rate (m^3/s) required for this diesel fleet?

Calculate the total ventilation rate for the 5 loaders and 8 trucks. Show how you calculated your answer

10. In the above mine, these ventilation rates are applied to the units for dilution of exhaust emissions at a rate of $0.05\text{m}^3/\text{s}$ per kW rated power.

What is the rated power of a single truck?

Calculate the rated power (kW) of a single truck. Show how you calculated your answer

11. The relationship between pressure loss, frictional resistance and ventilation rate is $P = R \times Q^2$

Where:

P = frictional pressure loss, Pa

R = airway resistance, Ns^2/m^8

Q = ventilation, rate m^3/s

If the pressure loss across a ventilation stopping is 1,500Pa and the resistance is 1,000 Ns^2/m^8 , what is the ventilation rate passing through the stopping

Calculate the ventilation rate (m^3/s). Show how you calculated your answer