

**SAMPLE ANSWERS TO SECTION A QUESTIONS OF THE JUNE 2003 MINING
QUALIFICATIONS BOARD EXAMINATION**

QUESTION A1

PART 1

i) The Reporting of Injuries, Diseases and Dangerous Occurrences Regs 1995

Schedule 2 Part II
Para 24

The outbreak of any fire below ground

Reg 3(1)(e)

Responsible person shall notify enforcing authority by quickest practicable means; and within 10 days send report to enforcing authority or within that period report to the Executive by other means approved.

ii) The Coal and Other Mines (Locomotives) Regulations 1956

Reg 21(1)

No person to use a locomotive for moving any vehicle otherwise than by hauling from in front except during shunting operations.

iii) MASHAM Regulations 1993

ACOP 83

Manager must ensure all plant and equipment is safely installed, commissioned, inspected, examined, tested, maintained and where necessary, repaired, renewed or decommissioned under direction and management of suitably qualified and competent persons. Suitably qualified and competent persons to supervise and undertake the work.

ACOP 94

Manager arrange system for dealing with defects and reporting those which are significant. These should be set out in writing with copies to each member of engineering staff.
Manager to arrange for written reports to be made of significant defects found and action taken to correct them.
Where defective plant is dangerous to use, must use devices to ensure the plant is immobilised.

iv) The Coal and Other Mines (Fire and Rescue) Regulations 1956

Reg 11(1)

If there appears smoke or other sign indicating a fire has or will break out the person in charge of that part of the mine shall cause all persons likely to be affected to leave it.

Reg 11(4)

Those parts of a mine deemed to be affected if a fire breaks out are:
❖ all parts of the seam in which the fire exists
❖ all parts of any seam reached from an entrance to a shaft or outlet being entrance from which the first mentioned seam is reached

v) Escape and Rescue from Mines Regulations 1995

Assessment of Risk

a) ACOP 13

The risks to be assessed should any emergency event occur to include:
❖ measures to enable persons to escape and protect them while doing so
❖ measures to rescue them if unable to escape without assistance

- b) ACOP 14 (a) When assessing the risk of fire or explosion, must:-
(i) consider presence of flammable materials including in addition to firedamp and coal dust, materials introduced such as mineral oil, wood etc, or electrical and other equipment which might be flammable
(ii) consider sources of ignition, including frictional and spontaneous combustion and other sources such as belt conveyors
- c) ACOP 14(c) The assessment of risks to persons to include the ability to escape to fresh air assuming unfavourable circumstances and locations where persons might be trapped.
Must include:
(i) layout and number of persons present in different parts, especially blind ends
(ii) the products of combustion spread and capacity of the ventilation
(iii) walking time from working area to fresh air, accounting for gradients
(iv) availability of transport which could be safely used

vi) Mines Miscellaneous Health & Safety Provisions Regulations 1995

- Reg 4(1) The owner shall ensure that the health and safety document has been prepared, which
(b) demonstrates adequate measures, including the design, use and maintenance of the mine and its equipment ,have and will be taken to safeguard health and safety of persons.
- Reg 4(2)(b) Document to include a fire protection plan detailing the likely sources of fire, the precautions to protect against, detect and combat outbreaks and spread of fires.

PART 2

- vii) The following monitoring equipment can be provided on conveyor belts in order to prevent and detect fires:
- belt alignment
 - belt slip
 - blocked chute
 - temperature monitoring of bearings, brakes etc
 - belt tension
 - CO sensors
 - FIDESCO
 - smoke detector
 - infra-red detectors

QUESTION A2

(i)

Electricity at Work Regulations 1989

- Reg 11 Efficient means, suitably located, shall be provided for protecting from excess of current every part of a system as may be necessary to prevent danger.
- Reg 11 ACOP 2 Excess current protection should operate at as low a value of time and current as possible allowing for any necessary discrimination to permit the effective operation of the equipment
- Reg 12(1)(b) In order to prevent danger suitable means shall be available for the isolation of any electrical equipment.
- Reg 12 ACOP 1(c) Suitable means for cutting off the supply may be initiated automatically or manually and should be arranged to minimise the loss of electrical power to equipment essential to the safety of persons such as ventilating fans.
- Reg 12(2) Isolation means the disconnection and separation of the electrical equipment from every source of electrical energy in such a way that the disconnection and separation is secure.
- Reg 12 ACOP 4 In providing means of isolation account should be taken of the accessibility and ease with which the procedure can be carried out, the circumstances under which it may be required and the need to prevent mistakes and to avoid restoration of power while work is being carried out, e.g. by the provision of facilities for padlocking, removable isolator handles and the posting of notices
- Reg 13 Adequate precautions shall be taken to prevent electrical equipment which has been made dead in order to prevent danger while work is carried out on or near that equipment, from becoming electrically charged during that work if danger may thereby arise.
- Reg 13 ACOP 1 Isolation should be carried out by a person competent to ensure that no danger would arise during the work or when the electricity supply is restored. The competent person should be a member of the electrical engineering staff and where it is necessary for one member of the staff to isolate for another then the member responsible should be a supervisory electrician.
- Reg 13 ACOP 2 During the time persons are working on equipment precautions should be taken to ensure the equipment remains isolated – earthing
- Reg 13 ACOP 3 A safe method of work is essential to ensure the continued effectiveness of measures taken – padlocks etc
- Reg 25 Any place at a mine where electrical energy above 125 volts ac is used a notice shall be displayed in a form which can be easily read and understood and containing information on the appropriate first aid treatment for electric shock and details of the emergency action to be taken in the event of an electric shock.
- Reg 25 ACOP 1 Notices shall be posted in sub-stations.

The Coal and Other Mines (Ventilation) Regulations 1956

Reg 23(1) No person other than the deputy in charge of a district affected or an official of the mine authorised by the manager or a person authorised by such a deputy or official shall start, stop, remove or alter any fan installed below ground at any mine.

Health & Safety at Work etc Act 1974

Reg 2(2)(a) The provision of maintenance of plant and systems of work that are so far as is reasonably practicable safe and without risk to health

Reg 2(2)(c) The provision of such information, instruction, training and supervision as is necessary to ensure, so far as is reasonably practicable, the health and safety at work of his employees

Reg 7(1)(a) It shall be the duty of every employee while at work:
to take reasonable care for the health and safety of himself and of other persons who may be affected by his acts or omissions at work

MASHAM Regulations 1993

Reg 11(3)(b) The manager shall ensure that a sufficient number of suitably qualified and competent persons are appointed to supervise the maintenance and inspection of all plant and equipment

Reg 11 ACOP 84(b) The appointment of persons as supervisory technicians to undertake the duties of regulation 11(3)(b)

Reg 11 ACOP 95 Engineers and technicians must frequently rely on their technical knowledge and experience to avoid personal danger, for example when isolating electrical or mechanical plant from the power supply

(iii)

The manager would be wrong not to report the incident as a dangerous occurrence under RIDDOR.

The reasons are that there was:

- ❖ Failure of an item of electrical equipment resulting in a fire or explosion
- ❖ The failure is reportable as a dangerous occurrence if the equipment is rendered unusable for more than 24 hours

Also, if the occurrence was one with the potential for serious injury to any person, then:

- ❖ The incident is reportable even if the damaged equipment is replaced with new equipment earlier than 24 hrs
- ❖ If the equipment is replaced with new an assessment of the time taken to repair the damaged equipment would need to be made

QUESTION A3

The Mines (Control of Ground Movement) Regulations 1999

i)

Reg 5

Manager shall ensure that

- a) before any excavation is undertaken all factors likely to affect ground movement are assessed to identify ground control measures which may need to be taken
- b) assessment is recorded in a document
- c) assessment reviewed, and where appropriate, revised if there is reason to suspect there has been a material change

ii)

ACOP 14

The assessment must take into account:-

- ❖ geological information
- ❖ mechanical properties of rock types
- ❖ effect of vertical and lateral stresses
- ❖ likely extent and nature of ground movement to be controlled
- ❖ potential failure mechanisms
- ❖ possible effects on other working places
- ❖ results of site investigations
- ❖ previous experience and relevant historical data
- ❖ mine environment and effects of ground water

Mines & Quarries Act 1954

iii)

Section 83

No locomotive shall be used below ground otherwise than with the consent of an inspector

iv)

Section 37(1)

Transport Rules must include:-

- ❖ height and width of each length of road
- ❖ maximum loads to be carried in vehicles (by reference to weight, dimensions, number or other criteria)
- ❖ maximum number of vehicles (loaded or unloaded) that may be coupled together to run as a set or train
- ❖ maximum speed
- ❖ prohibiting carrying of people, except in accordance with conditions and specifying precautions

The Coal and Other Mines Locomotive Regulations

v) a)

Track Standards for locomotives require:-

Reg 6(1)

- ❖ track ballasted and where necessary, drained
- ❖ centres of adjacent sleepers 840mm maximum
- ❖ all joints fishplated with four bolts

- Reg 6(2)(c) 19kg per metre
- Reg 6(3) Allowing for swing, clearance between trains on adjacent tracks is a minimum of 300 mm
- v) b) Clearances:
- Reg 7(2)(a) Minimum vertical clearance is 300 mm above cab roof
- Reg 7(3) Horizontal clearance not less than 600mm, provided that on the side on which there are no refuge holes, horizontal clearance will be a minimum of 300 mm

The Coal and Other Mines (Shafts, Outlets and Roads) Regulations

- v) c) Refuge Holes placed at:-
- Reg 59(2)(d) 90 metre intervals
- Reg 59(6) Every refuge hole shall be made on the side of the road in which there is a 600mm clear space
- Reg 59(8) Every refuge hole shall be marked with a distinctive number, and if necessary to make visible, whitewashed inside and 300mm around aperture and kept clean
- v) d) Loco Road Communications
- Reg 80 Telephonic communication must be maintained between furthest inbye point, and the outbye end and the surface.

The Mines (Safety of Exit) Regulations

- vi) This roadway should be:
- Reg 9(b) Constructed from suitable fire resistant materials free from risk of fire
- ACOP 38 Precautions to be taken to include:
- ❖ use of equipment and materials that are non-flammable or fire resistant
 - ❖ use of fire resistant supports
 - ❖ doors of fire resistant construction
 - ❖ suitable and sufficient means of extinguishing any fire
 - ❖ provision of automatic means to detect outbreak of fire

QUESTION A4

i

- (a) owner of the mine
mine manager
mine surveyor

MASHAM Regulations 1993

- Reg 6(5) Duty of owner to secure that mine is managed, worked, planned in accordance with statutory provisions.
- ACOP 24 Essential that an identifiable person should have ultimate responsibility for its planning and safe working.

Mines (PAI) Regulations 1979

- Reg 3 Duty of Manager to prevent any inrush into the working of:-
a) gas from disused workings
b) water or material that flows when wet from any source
- ACOP 16 Manager has specific duties related to the hazard of inrush

MASHAM Regulations 1993

- Reg 28(a) Duty of surveyor that the plans, sections and working papers required under the relevant provisions are suitable, complete and accurate.
- ACOP 182 Plans show clearly and accurately as possible the extent and position of any abandoned workings.
- * May be a number of combinations of Regs and ACOPs. Will be marked as appropriate, but answer should relate to circumstances at the mine as described.*

ii

MASHAM Regulations 1993

- a) These Regulations require that:-
- Reg 29(2)(d) Plans shall be prepared for:
(i) provision of accurate information relevant to the safe working of the mine
(ii) provision of accurate information on the position and condition of existing workings and as far as practicable, workings that have been abandoned
- ACOP 182 Plans to show clearly and accurately the position of abandoned or disused workings whether of the mine or any other mine within 15 metres of boundary
- b)
- Reg 29(5) Regulations require to be kept at office of the mine a plan showing the system of ventilation at the mine, the direction of flow, the quantity measuring points and the location of devices for regulating the flow.

- ACOP 193 Separate plan kept at the mine to show the ventilation system including the:-
- direction of airflow
 - air quantity measuring points
 - principal means of Regulation
 - Intakes shown blue
 - Returns shown red
- c) Items to be included on any Plan designed to show information regarding a potential water inrush:-
- ACOP 186 Position of dams which may affect the workings – dimensions, date, construction and pressure
- ACOP 187 Position and level at top and bottom of every shaft, outlet drift which gives access to the workings, together with the level of every entrance giving access from the workings
- ACOP 188 Plans to show variations in level, contour and gradient

iii

The Prevention of Inrushes in Mines Regulations (PAIR)

- Reg 6(5)(a) Manager ensures he has prepared a scheme of work which lays down the procedure to be followed designed to ensure that an inrush does not occur

iv

- ACOP 31 If it is the case that the prevention of inrush depends on the maintenance of water/gas drainage or pumping systems, then a scheme of work should be prepared which includes information on these precautionary and preventative measures

v

The Mines (Safety of Exit) Regulations 1988

(a)

- Reg 9 Manager shall ensure that apart from those persons who are going to or leaving their place of work at the beginning or end of a shift, not more than 50 persons are employed underground unless

(b) there is one intake airway which is constructed of suitable fire resistant materials and is free from the risk of fire

(b)

- ACOP 38 Where the single intake airway is in use, the following precautions must be taken:
- (a) use of non-flammable equipment and materials
 - (b) use of fire resistant supports and conveyor belting to appropriate standard
 - (c) use of doors of fire resistant construction
 - (d) provision of suitable and sufficient means of extinguishing a fire

vi

Coal Mines (Ventilation) Regulations 1956

(a)

Reg 22(1)

In every road which is a connection between
a) a main intake airway and a main return airway
there shall be provided and maintained at least two suitable doors to minimise leakage

Reg 22(3)

Doors provided so spaced that when one door opens, at least one other is closed

Reg 22(4)

Doors must be self closing

(b)

Reg 33(1)

Main return airway means a length of return airway which ends at a shaft or outlet or a length of airway, the current of air in which has been split and which as regards two or more working faces, is a return airway

vii

When choosing the site for any dam, the mine manager should consider:-

- is the site clear of faulted ground?
- is it in solid ground unaffected by mining?
- avoid the need for auxiliary ventilation.