

SECTION A

QUESTION A1

A 275m longwall retreat face extracting a section of 1.9 m is reaching the end of its production life as it approaches its planned stop line. It is proposed to salvage all the equipment from the face line once production has ceased and transport it to another face. This is to be done by a team employed by a contracting company.

All the major equipment on the face, i.e. shearer, line pans with furnishings, conveyor drives and powered roof supports are to be salvaged. They are to be removed from the face line by free steered vehicle dragging (towing) them along the floor. They will then be lifted onto specially designed rail vehicles at a lifting station to be built at the main gate end of the face for the journey along the gateroad to their new destination. The powered roof supports are to be removed last from the face. They are to be replaced by a support system that retains the face line as a second means of egress and allows the continued flow of ventilation through the face.

The mine manager calls a meeting of his staff and the contractor's management with a view to planning the salvage exercise. In addition to the operational aspects of this exercise, he seeks to establish how certain aspects of Regulations and ACOPs affect his planning.

In answering the following questions:-

- state precise statutory references to **Regulations** quoted
- **précis** the main points of the **Regulations** used
- state the paragraph number of any **Approved Code of Practice (ACOP)** quoted
- **précis** the content of the **ACOP** paragraph used

- i) The mine manager has a general duty to secure the safety of the mine by ensuring an appropriate support system is applied to the face during the salvage.

What do **Regulations** specify with regard to:-

- a) his general duties in this regard
- b) the basis for his choice of support system for the face salvage
- c) the formal way in which support design decisions are communicated to persons who work at the mine

What does an **ACOP** recommend with regard to:-

- d) the role of temporary supports or ground reinforcement in a face salvage

- ii) During the removal of the powered supports, it will remain necessary to maintain access and ventilation along the whole face line.

What do **ACOPs** specify with regard to:-

- a) the frequency of inspections of the old face line
- b) the minimum dimensions to be maintained on the old face line

- iii) Engineers at the mine are to design a lifting station to transfer the salvaged items onto rail vehicles at the end of the face.

What do **Regulations** state about the employer's duties with respect to:-

- a) the ability of the lifting equipment to lift the loads presented to it
- b) the indication of safe working loads
- c) the organisation of lifting operations

- iv) **Regulations** specify requirements for the host employer to supply health and safety information to employee's of another employer when they are working in the host employer's undertaking. Which of these requirements apply in this case?
- v) There are restrictions on the use of unskilled contractor's employees on this work.
 - a) What do **Regulations** specify with regard to this issue?
 - b) An **ACOP** sets out a system aimed at ensuring that unskilled contractor's employees are not employed at the mine. What is this system?

QUESTION A2

A colliery in working in a particular area underground that has been known to experience sudden outbursts of firedamp normally associated with faulting.

A JCM development heading, some 1300 metres long is being driven to form the proposed tailgate of a retreat face. It has a planned total drivage of some 1500 metres beyond which is a known area of faulting. General conditions in the heading are good.

With the possibility of a known hazard being present, the working arrangements and equipment requirements have been carefully evaluated by the Manager.

On a Friday day shift, 12 persons were working in the heading when a sudden outburst of coal and gases occurred at the JCM whilst it was cutting, resulting in a toxic atmosphere at the face of the heading and severe pollution of the heading and return airway.

In answering the following questions:

- state precise statutory references to **Acts and Regulations** quoted
 - précis the main points of the **Acts and Regulations** used
 - state the paragraph number of any **Approved Code of Practice (ACOP)** quoted
 - précis the content of the **ACOP** paragraph used
- i) Identify five (5) requirements in **Regulations**, each supported by an appropriate **ACOP**, that specify the responsibilities of the Owner and/or the Manager to ensure that everyone working in the heading has the capability to survive and escape from the toxic atmosphere in the heading.
 - ii) The Owner has a duty in **Regulations** that no work is undertaken at the mine unless a 'document' has been prepared.
 - a) What should this document demonstrate?
 - b) What should the document include in relation to the planning of this particular drivage and the known hazard that might exist?
 - iii) Should the Manager report the incident as a Dangerous Occurrence? Outline the reason for his decision.
 - iv) What do **Regulations** require of the Manager to enable more than nine (9) persons to work in the heading? Support your answer with reference to actions required by the appropriate **ACOP**.
 - v) With reference to an **ACOP** only, how may the Owner ensure that two (2) rescue teams of five (5) team members each are available to attend the mine following such an incident?
 - vi) List five (5) practical safety measures – work procedures or equipment – the Manager could provide in such a development drivage. No reference to any legislation is required.

QUESTION A3

In a length of a single intake airway in a coal mine, a conveyor belt patrolman was walking inbye. He was examining a newly installed transfer point between two conveyor belt installations, when he noticed flames coming from the return end of the outbye conveyor belt. The conveyor belt was rubbing heavily on one side of the return end structure, and the flames had spread to a large amount of coal spillage that had accumulated below the transfer chute. He stopped the outbye conveyor and, not being able to find means of fighting the fire, he ran outbye to the nearest telephone. The surface control was informed of the fire and a team of men was promptly organised to fight the fire.

On their arrival at the scene, they found that the fire had spread to the inbye belt conveyor and attempted to extinguish it using water from the nearest available point, which was from a hydrant situated in a nearby cross connection to the main return. However, they could not reach the front of the fire that was propagating inbye along the conveyor belting.

At the time there were 55 persons working inbye of the fire and several noticed smoke, raised the alarm, and all persons escaped via the return airway. The fire was eventually extinguished by sealing off the roadways to the district involved.

PART 1

In answering the following questions: -

- state precise statutory references to **Regulations** quoted
 - **précis** the main points of the **Regulations** used
 - state the paragraph number of any **Approved Code of Practice (ACOP)** quoted
 - **précis** the content of the **ACOP** paragraph used
- i) What do **Regulations** require of an employer with respect to the hazards and risks to health and safety, and what should have occurred before the new transfer point was used?
 - ii) When planning and installing the transfer point, what do **Regulations** and **ACOPs** require regarding the suitability of work equipment and its location of use?
 - iii) What do **Regulations** require regarding the health and safety document to be held at the mine with respect to fire?
 - iv) **Regulations** and **ACOPs** specify measures regarding precautions to be taken in a single intake airway of roadway involved. What are these measures?
 - v) What do **Regulations** require of the Owner regarding rules covering particular areas of safety such as a fire?
 - vi) What are the duties of a manager, specified by **Regulations**, to secure the provision and readiness for immediate use in the case of fire, and what do the **Regulations** state when there is an outbreak or suspected outbreak of fire in a coal mine?

PART 2

No reference to any legislation is required in this part.

- vii) Describe briefly five (5) safety measures that are normally provided for conveyor belt installations and the roadways they operate in.

QUESTION A4

An operational coal mine with two shafts and no other means of egress to the surface has planned improvements to the mine infrastructure to improve reliability and overall performance. One of the improvement initiatives is to modernize the winding equipment to improve the shaft availability.

The Electrical Engineer at the mine is preparing to replace the safety circuit equipment with modern control equipment (programmable logic controller) on one of the existing winding engines.

The works are to be undertaken over a long weekend with the winding equipment planned to be out of commission for at least 48hrs.

In answering the following questions: -

- state precise statutory references to **Regulations** quoted
 - **précis** the main points of the **Regulations** used
 - state the paragraph number of any **Approved Code of Practice (ACOP)** quoted
 - **précis** the content of the **ACOP** paragraph used
- i) Duties are placed on the manager with regard to the shaft being temporarily out of action. What do **Regulations** and **ACOPs** specify in this case.
 - ii) When specifying and procuring new electrical equipment to be used, the electrical engineer is required to consider certain features in the design of that equipment. Specify the **Regulations** and **ACOPs** explaining which of the features need to be considered.
 - iii) The electrical equipment will be connected to the mine power supply. Using **Regulations** and **ACOPs** indicate what precautions should be taken to avoid danger from the subsequent use of the equipment and how the integrity of the protection is maintained?
 - iv) The **Regulations** and associated **ACOPs** define what steps and procedures need to be taken, with respect to the electrical installation, to ensure the suitability of the equipment for use.
 - v) **Regulations** are clear as to what is required when modifications are carried out that may effect the safe operation of such equipment. State the requirements of the **Regulations**.
 - vi) Testing will be carried out as part of the commissioning process. What regular tests specified by **ACOPs** shall be carried out prior to the winder being put back into service?
 - vii) List five (5) actions specified by an ACOP that are necessary following modifications to winding equipment