Question 1

You are the employer of a gold mine. The Mine Health and Safety Act requires you to staff the mine in such a way that you consider the health and safety of the employees. What must you do in terms of Section 7 of the Mine Health and Safety Act? (10)

7. Employer to staff mine with due regard to health and safety

(1) As far as *reasonably practicable*, every *employer* must-

(a) ensure that every *employee* complies with the requirements of *this Act*;

(b) institute the measures necessary to secure, maintain and enhance *health* and *safety*;

(c) provide persons appointed under subsections (2) and (4) with the means to comply with the requirements of *this Act* and with any instruction given by an *inspector*;

[Para. (c) substituted by s. 7 (b) of Act 72 of 1997]

(d) consider an *employee's* training and capabilities in respect of *health* and *safety* before assigning a task to that *employee*; and

(e) ensure that work is performed under the general supervision of a person trained to understand the *hazards* associated with the work and who has the authority to ensure that the precautionary measures laid down by the *employer* are implemented.

[Sub-s. (1) amended by s. 7 (a) of Act 72 of 1997]

(2) The *employer* may appoint any person with qualifications as may be prescribed to perform any function of the *employer* in terms of *this Act*.

(3) The appointment of a person under subsection (2) does not relieve the *employer* of any duty imposed on *employers* by *this Act*.

(4) A *manager* may appoint any person with qualifications as may be *prescribed* to perform any function of the *manager* in terms of *this Act*.

[Sub-s. (4) added by s. 7 (d) of Act 72 of 1997]

(5) The appointment of a person under subsection (4) does not relieve the *manager* of any duty imposed on *managers* by *this Act*.

Question 2

You are the employer of a coal mine. You are required to assess and respond to risk. In terms of the Mine Health and Safety Act Section 11, how are you going to do this? (10)

11. Employer to assess and respond to risk

(1) Every *employer* must-

(a) identify the *hazards* to *health* or *safety* to which *employees* may be exposed while they are at work;

(b) assess the *risks* to *health* or *safety* to which *employees* may be exposed while they are at work;

(c) record the significant *hazards* identified and *risks* assessed; and

(d) make those *records* available for inspection by *employees*.

(2) Every *employer*, after consulting the *health* and *safety committee* at the *mine*, must determine all measures, including changing the organisation of work and the design of safe systems of work, necessary to-

(a) eliminate any recorded *risk*;

(b) control the *risk* at source;

(c) minimise the *risk*; and

(d) in so far as the *risk* remains-

(i). provide for personal protective equipment; and

(ii). institute a programme to monitor the *risk* to which *employees* may be exposed.

(3) Every *employer* must, as far as *reasonably practicable*, implement the measures determined necessary in terms of subsection (2) in the order in which the measures are listed in the paragraphs of that subsection.

(4) Every *employer* must-

(a) periodically review the *hazards* identified and *risks* assessed, including the results of *occupational hygiene* measurements and *medical surveillance*, to determine whether further elimination, control and minimisation of *risk* is possible; and

(b) consult with the *health* and *safety committee* on the review.

Question 3

Define the following in terms of the Mine Health and Safety Act.

Health and Safety equipment. (4)

Processing. (4)

Record. (2)

'health and safety equipment' means an article or part of an article that is manufactured, provided or installed in the interest of the *health* or *safety* of any person;

'processing' means the recovering, extracting, concentrating, refining, calcining, classifying, crushing, milling, screening, washing, reduction, smelting or gasification of any *mineral*, and **'process'** has a similar meaning;

'record' includes information contained in or on a computer printout, tape or disc or any other computer storage medium;

Question 4

You are the engineer in charge of a shaft that uses winding plants. A conveyance got stuck in the shaft causing slack rope to occur. What safety precautions need to be taken to rectify the situation, where is it necessary to install a slack rope device, what does a slack rope device do? (10)

16.9.2.1 The *employer* must install a device or combination of devices that detect slack rope on every winding plant which the rope is attached to the drum operating in a vertical shaft, excluding a shaft in the course of being sunk.

16.9.2.2 The device or combination of devices contemplated in regulation 16.9.2.1 must on detecting a slack rope condition either automatically halt all winding operations in the vertical shaft safely or warn all winding engine drivers operating in such shaft of the slack rope condition.

[Reg. 16.9.2.2 inserted by GN R802 of 19 June 1998.]

16.9.2.3 The *employer* must establish an effective and safe procedure for rectifying any slack rope procedure.

[Reg. 16.9.2.3 inserted by GN R802 of 19 June 1998.]

16.9.2.4 All winding operations in the vertical shaft must cease when a slack rope condition occurs, except such operations necessary for rectifying the slack rope condition authorised by the engineer or person appointed in terms of regulation 2.13.2.

[Reg. 16.9.2.4 inserted by GN R802 of 19 June 1998.]

16.9.2.5 No winding operations may resume, except operations permissible in terms of regulation 16.9.2.4, until the slack rope condition has been rectified.

Question 5

You are the manager of an underground mine. The mine makes use of locomotives and hoppers to transport the mineral. What are the requirements in terms of the machinery and equipment regulations of the Mine Health and Safety Act regarding rail-bound transport? (10)

8.2 Underground Railbound Transport

The *employer* must take reasonable measures to ensure that:

(1) the braking system of every locomotive or train is capable of stopping the locomotive or train within a safe distance under all operating conditions;

(2) the braking system of every locomotive has passed a dynamic type test under full load conditions, before being used for the first time and after any brake design modifications;

(3) the braking system of every locomotive has passed a static test before the locomotive is put into use at the commencement of each shift, after repairs and after adjustments;

(4) a system is in place to alert persons to the presence and direction of travel of any locomotive or train;

(5) a system is in place to assist the driver or operator of a locomotive or train to travel at a safe speed;

(6) any rolling stock used for the transportation of persons is approved, by a competent person and is operated and maintained safely;

(7) a system is in place that is capable of preventing any **locomotive** or **train** from inadvertently being set in motion.

8.3 No person may board or alight from a **locomotive** or **train** while it is in motion.

Question 6

You are working in an open cast mine that uses diesel powered trackless mobile machines (TMM). You are the engineer in charge of the trackless machines. What are the requirements to prevent collisions between TMM. (10)

Collisions between diesel powered trackless mobile machines

(2) The *employer* must take *reasonably practicable* measures to ensure that persons are prevented from being injured as a result of collisions between diesel powered trackless mobile machines. At any opencast or open pit mine where there is a significant risk of such collisions, such measures must include:

(2.1). Every diesel powered trackless mobile machine must be provided with means to automatically detect the presence of any other diesel powered trackless mobile machine within its vicinity; and

(a) upon detecting the presence of another diesel powered trackless mobile machine, the operators of both diesel powered trackless mobile machines shall be warned of each other's presence by means of an effective warning; and

(b) in the event where no action is taken to prevent potential collision, further means shall be provided to retard the diesel powered trackless mobile machine to a safe speed where after the brakes of the diesel powered trackless mobile machine are automatically applied. The prevent potential collision system on the diesel powered trackless mobile machine must 'fail to safe' without human intervention.

Question 7

You are the engineer in charge of the winding plant at a gold mine. What must you examine carefully and at what intervals to ensure you comply with your responsibilities stated in Minerals Act Regulation 16.75? (10)

16.75 An engineer or competent person appointed in terms of regulation 2.13.2, as the case may be, shall examine carefully-

[Reg. 16.75 amended by GN 160 of 1 February 1991.]

16.75.1 at least once in each week, and at intervals not exceeding 10 days, the overspeed and overwind prevention devices and the external parts of the winding engine;

[Reg 16.75.1 amended by GN R2703 of 11 December 1981.]

16.75.2 at least once in each year the winding engine as to the condition of the internal mechanical parts and, as far as *reasonably practicable*, the internal electrical parts;

16.75.3 at least once in each calendar month at intervals not exceeding 45 days the structure of the winding rope and the balance rope or tail rope, with a view to ascertaining the amount of deterioration thereof. For the purpose of this examination the rope shall be cleaned at a place selected by the person making the examination who shall note any reduction in the circumference of the rope, any variation in the length of the rope, the superficial condition of the wires as to wear, corrosion, fractures and brittleness, and all other data necessary for ascertaining the amount, extent, and distribution of the deterioration of the rope. If the examination discloses features such as undue or rapid wear or fractures of the wires, which, although not constituting sufficient reason for condemning the rope, call for more than usual attention, the examination required under this paragraph shall be made more frequently;

16.75.4 at least once in each calendar month at intervals not exceeding 45 days the connections between the winding rope and the drum, the connections referred to in regulation 16.18 and the sheave wheel or wheels;

[Reg 16.75.4 amended by GN R2703 of 11 December 1981.]

16.75.5 after every accident or occurrence referred to in regulation 25.6(a) and before winding operations are resumed, all portions of the winding equipment affected by such accident or occurrence on which the safety of persons depends;

16.75.6 by dynamically testing the automatic overwind and overspeed prevention devices at least once in every six months, at intervals not exceeding 200 days.

16.76 In the case of connections referred to in regulation 16.18 being of a class of steel approved by the *Chief Inspector*, such connections and their component parts shall be dismantled, cleaned and then examined by an engineer or competent person appointed in terms of regulation 2.13.2, as the case may be, at intervals not exceeding 12 months.

[Reg. 16.76 amended by GN 160 of 1 February 1991 and by GN R94 of 15 January 1997.]

16.77 If on any examination required in terms of regulations 16.73, 16.74, 16.75 and 16.76 there is discovered any weakness or defect which may endanger the safety of persons, and such weakness or defect cannot be remedied immediately, the person making the discovery shall report such weakness or defect to the manager without delay. Until such weakness or defect is remedied the winding plant shall not be used except in so far as may be necessary to remedy such weakness or defect.

Question 8

The employer must ensure that a procedure is prepared and implemented for the examination, testing, repair and maintenance of a lift in terms of the Mine Health and Safety Act regulations. What must the procedure provide for? (10)

Examination and testing of lifts

(7) The *employer* must take reasonable measures to ensure that a written procedure is prepared by a competent person and implemented for the examination, testing, repair and maintenance of every lift. Such procedure must take into account:
   (a) any original equipment manufacture's recommendations;
   (b) the relevant SANS standard; and
   (c) the site specific risks identified in terms of the mine's risk assessment.

(8) The procedure contemplated in regulation 8.11.7 must provide for at least the following:
   (a) that a competent person examines and tests the entire lift installation at least once a month;
   (b) that a competent person examines at least once a calendar week the lift installation, well, guides, ropes and rope attachments, the driving machinery, the drums, sheaves, all safety devices and appliances to identify any deterioration of the components;
   (c) that records are kept readily available at the mine of the examinations carried out and of the competent persons who did the examinations; and

(d) that a recoverable recordable system is established and maintained at the mine in which is captured details of all maintenance, repairs, testing, inspections and examinations of the lift installation and of the findings, which must be captured by the competent person who undertook the maintenance, repairs, inspections or examinations within 24 hours from completion of such maintenance, repairs, inspections or examinations.

Question 9

The mine, where you are employed as the responsible engineer makes use of chairlifts to transport persons. What does the Mine Health and Safety Act state about the requirements for examination and testing of chairlifts. (10)

Examination and testing of chairlifts

(8) The **employer** must take reasonable measures to ensure that a written procedure is prepared by a competent person and implemented for the examination, testing and maintenance of every chairlift. Such procedure must take into account:
   (a) any original equipment manufacture's recommendations;
   (b) SANS 273:2007 Edition 1 'Standard for the design, construction, maintenance and safe operation of chairlifts in mines'; and
   (c) the site specific risks identified in terms of the mine's risk assessment.

(9) The procedure contemplated in regulation 8.12.8 must provide for at least the following:
   (a) that a competent person examines and tests the entire chairlift installation at least once a month;
   (b) that the chairlift installation is functionally tested and examined at least once a week by a competent person(s);
   (c) that if as a result of examination or test any weakness or defect is found which presents a significant risk to any person, the chairlift is not used until the defect has been rectified; and
   (d) that a lock-out procedure is in place to remove the tension on the hauling rope before any repair or replacement on the drive system is undertaken.

Question 10

The guideline for the compilation of a mandatory Code of Practice for the safe use of conveyor belt installations needs to address the design. What design criteria must the code of practice cover? (10)

8.1 Design

8.1.1 In order to prevent persons from being injured as a result of a **conveyor belt installation** collapsing, catching fire, a belt breaking or misalignment of the conveyor belt due to incorrect design, the **COP** must set out the design criteria for the belt conveyor installation, covering at least the following:

- Overall structural design;
- Environmental conditions that could affect the integrity of the **conveyor belt installation**;
- An appropriate drainage system along the **conveyor belt installation** to ensure efficient draining of water used for cleaning, dust suppression and prevent water seepage onto the **conveyor belt installation**;
- Appropriate **power supply** and braking systems;
- Conveyor belt extensions;
- Materials of which the conveyor belt is made of in order to minimise the risk of igniting flammable gas or dust during installation or operation;
- Materials of which the conveyor belt is made of in order to minimise the risk of any part of the conveyor belt catching fire; and
- Adequate lightning protection.