

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD
UNIVERSITY OF MALTA, MSIDA

SECONDARY EDUCATION CERTIFICATE LEVEL

SEPTEMBER 2016

SUBJECT:	Engineering Technology
PAPER NUMBER:	Synoptic – Unit 1
DATE:	1 st November 2016
TIME:	10:00 a.m. to 12:05 p.m.

**THIS PAPER SHOULD BE RETURNED TO THE INVIGILATOR
AFTER THE EXAMINATION.**

Answer ALL questions**Scenario:**

An established construction company is expanding its activities and wants to go into the business in a more professional manner.

The company is also engaging into engineering tasks. Such tasks include, air systems, hot and cold water systems as well as plant room equipment.

You are required to help out some of the employees to figure out difficulties during their working shifts. Some of the problems encountered are listed below as questions for you. For your assignment, answer all questions given below.

Question 1**K 1 (4 marks)**

You are given a number of activities that require the use of PPE. Give a correct example for each activity. (No PPE can be repeated more than once). The first one is done for you.

Activity:	Type of appropriate PPE to protect for the activity.
Karl is grinding a mild steel rod and needs to protect his eyes.	Protective glasses
Sarah is walking in the workshop, where there are sharp pieces that may harm her feet.	
Malcolm is working in an environment where the noise is beyond the permissible level. He exposes himself to excessive noise for an excessive period of time.	
Bernice is handling pieces of iron that may be sharp, hot or have chemicals that may be corrosive to the hand.	
Ramona is carrying out welding procedures that give off poisonous gasses during the process.	

Table 1

Question 2**K 2 (4 marks)**

Answer the following multiple-choice questions and show the relationship between PPE and working in a construction site.

(Underline the correct answer. The first one is done for you)

- a. A person carrying out work using a drilling machine is required to wear:
- Ear defenders.
 - Helmet.
 - Safety goggles.
 - Rubber apron.
- b. A safety harness is required to be worn by a person:
- Laying floor tiles in a bedroom on the second floor of a house.
 - Constructing a fence in a garden.
 - Installing a water tank on the roof of a washroom.
 - A person installing a water tank on the ground floor garden.
- c. The safety boots worn by an electrician must have:
- Steel protection for the toes.
 - A strong and thick insulation rubber sole.
 - Leather material.
 - The sole made up of conductive rubber for good earth connection.
- d. Which of the following PPE is typically seen at a construction site?
- Hard hat.
 - Rubber Apron.
 - Boiler's Suit.
 - Workshop cotton over-all.
- e. A worker preparing loads for lifting in the middle of a road must wear:
- Safety goggles.
 - Ear protectors.
 - High visibility vest.
 - Safety harness.

Please turn the page.

Question 3

K 3 (4 marks)

The warning signs shown below are used to show that a particular substance falls within one of the main groups of hazardous substances.

By drawing a line, identify the correct hazard related to the appropriate warning sign. The first one is done for you.



Caution/Harmful



Toxic



Gas under pressure



Corrosive



Environmental Hazard



Table 2

Question 5**K 6 (8 marks)**

Underline the correct answer in the following multiple choice questions. The first one is done for you.

- a. What is the importance of a risk assessment?
- To ensure that no one carries the responsibility of an accident.
 - To ensure that the company does not carry fees in case of injury to humans.
 - To identify who may be at risk and provide measures to eliminate or control dangerous situations.
 - To increase costs of running the company.
- b. What is a risk assessment?
- It is an assessment in which persons may get hurt.
 - It is an exercise in which hazards are identified.
 - It is an exercise with a high risk of failure.
 - It is an exercise where a person is allowed to take risks.
- c. How would the level of risk be indicated in a risk assessment?
- By using a colour code like green, yellow, blue and red.
 - By numbering a risk , 1 being the least and 4 being the highest.
 - By using letters where (a) is the highest and (d) is the lowest risk.
 - By using terminology like very low risk, low risk, high risk and very high risk.
- d. In a risk assessment:
- It is important to indicate what measures must be taken to reduce the risk.
 - It is only important to indicate the risk.
 - There is no need to indicate the risk.
 - Only the important risks need to be indicated.
- e. A risk assessment should be given to:
- The top management only.
 - All persons at the factory.
 - The persons involved with the risks.
 - The persons responsible with eliminating the risks from the place of work.

Question 6

K 7 (8 marks)

- a. A wood worker uses many sharp tools during his/her duties. Imagine if the wood worker suffered an injury. The injury consists of a slight cut in the finger. Describe the first aid procedures taken to stop the flow of blood from the wound.

(2 marks)

- b. A mechanic dismantles the fuel tank of a car. When draining the fuel the mechanic leaves the fuel in an open tank. For some accidental reason, the fuel bursts into flames.

- i. State the class of fire in this case.

(2 marks)

- ii. What extinguishing agent is suitable to put out the fire?

(2 marks)

- iii. Describe the procedure to extinguish the fire.

(2 marks)

Please turn the page.

Question 7 K 8 (4 marks)

At the work shop different technical information is available. Some of the information is listed in List 1 below:

Block diagram
Assembly diagram
Wiring schematic diagram
Exploded view
Maintenance manual

List 1

The information is used according to the need of the task and the workers.

By filling the table below, distinguish the document needed (from List 1) according to the activity listed in Table 3.

The first one is done for you.

Activity	Type of technical information
Karl needs to assemble a water pump.	Assembly diagram
Ramona is trying to obtain the part number for a particular rubber ring in a pump.	
Malcolm requires the grade of grease suitable for a machine.	
Bernice is following an electrical fault.	
Sarah needs to understand the process that a machine follows.	

Table 3

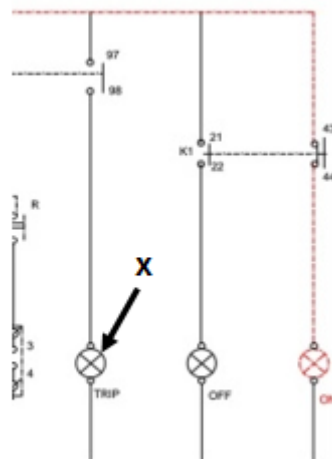
Question 8**K 9 (4 marks)**

Answer the following multiple choice questions. Underline the correct answer.

- a. According to BS EN 1089-3, what is the gas inside the gas cylinder which is colour coded black?
- Argon.
 - Nitrogen.
 - Carbon Dioxide.
 - Helium.
- b. In a factory, a pipe is marked as shown in Figure 2. According to BS1710, what medium is the pipe carrying?
- Chilled water.
 - Hot water.
 - Fuel.
 - Drinking water.

**Figure 2**

- c. What is the electrical item indicated by X in Figure 3?
- Switch.
 - Lamp.
 - Circuit breaker.
 - Fuse.

**Figure 3**

Please turn the page.

- d. What welding symbol is shown in Figure 4?
- i. Square butt weld
 - ii. Fillet weld
 - iii. Single V-butt weld
 - iv. Spot weld



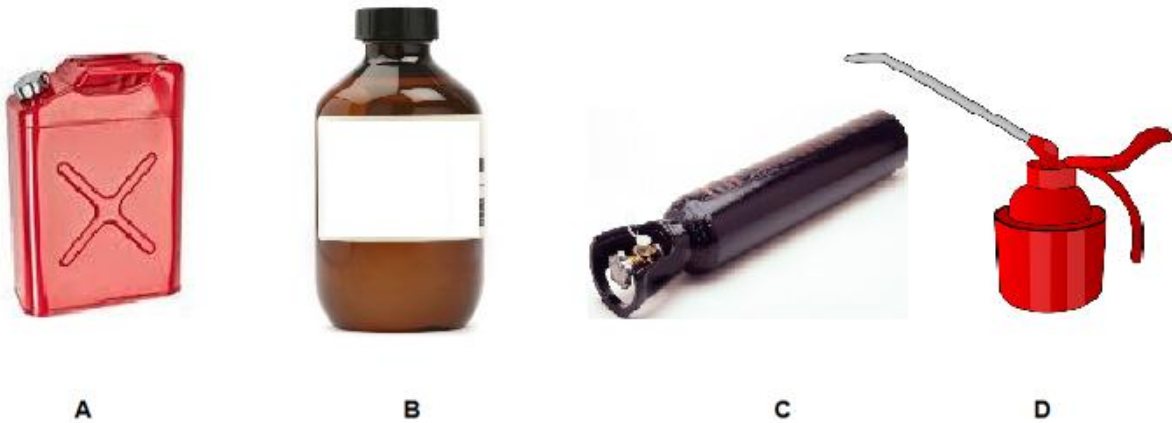
Figure 4

Question 9

C 1 (10 marks)

- a. Match the correct substance with the correct packaging/storage method in Table 4.

(2 marks)



Substance	Container
Chemicals	
Argon	
Diesel	
Oil	

Table 4

b. Explain why it is important to use the correct container for different substances.

(4 marks)

c. Describe the importance of using a label on the container.

(4 marks)

Question 10

C 5 (10 marks)

Documents at the place of work are very important. They provide important information about technical and administrative issues. Therefore they must be well kept and available when needed.

List **four** documents found at the place of work.

- i. _____
- ii. _____
- iii. _____
- iv. _____

(½ mark each)

a. Explain what criteria should be considered when selecting the place of storing documents.

(4 marks)

b. Explain **two** procedures to be followed so that documents are handled safely in order to be reused.

Procedure 1:

Procedure 2:

(4 marks)

Question 11

C 4 (10 marks)

In the engineering world, much of the information is transferred from one person to another using diagrams and written instructions.

At the place of work one can find several procedures including:

- i. Health and safety procedures
- ii. Communication between staff
- iii. Working procedures
- iv. Planning procedures
- v. Operating procedures
- vi. Stores procedures
- vii. Procurements (buying of material) procedures
- viii. Financial procedures

Select any five procedures and for each discuss the importance of the procedure at the place of work.

Procedure 1: _____

Procedure 2: _____

Procedure 3: _____

Procedure 4: _____

Procedure 5: _____

(10 marks)

Question 12

A 1 (15 marks)

In a particular construction site, workers need to work at a height of 15m. Their job is to paint the outside of a building. In doing so they need to use a scaffolding.

The law in Malta (Legal Notice 121 of 2003) clearly puts the responsibility of health and safety regulations, in particular the use of PPE, on both the employer and the worker.



Figure 5

Your task is to:

- a. Mention **three** responsibilities of the employer and indicate their importance.

Responsibility 1 and its importance:

Responsibility 2 and its importance:

Responsibility 3 and its importance:

(9 marks)

- b. Mention **one** responsibility of the worker and indicate its importance.

(2 marks)

- c. Give **two** examples of relevant PPE for the particular situation presented in Figure 5 and indicate their use.

Example 1:

Example 2:

(4 marks)

Question 13

A 2 (15 marks)

A risk assessment is an important tool to improve safety at the place of work. In the picture shown in Figure 6, some workers are busy at work, however they are not caring too much about their safety.

Your task is to carry out a basic risk assessment of the situation presented. In your risk assessment identify three potential hazards, the risks associated with them and explain what measures are taken to reduce danger to a minimum.

Hazard 1

Hazard 2

Hazard 3

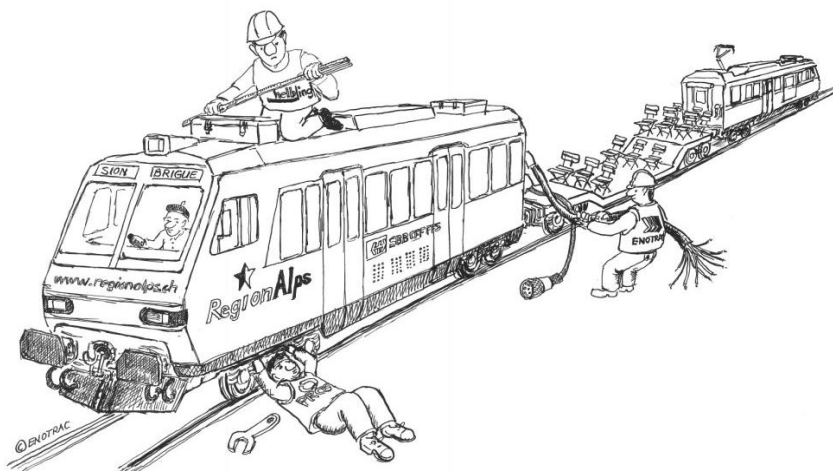


Figure 6

(15 marks)

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