EXTERNAL INTEGRATED SUMMATIVE ASSESSMENT

MAINTENANCE PLANNER

EXEMPLAR 1B - MEMORANDUM

STUDENT NAME & SURNAME	
ID NUMBER	
EISA REGISTRATION NUMBER	
ASSESSMENT CENTRE	
ASSESSMENT CENTRE ACCREDITATION NUMBER	
QUALIFICATION	Occupational Certificate: Maintenance Planner
SAQA ID	101874
CREDITS	261
PAPER	1B (there are 3 papers to be written: 1A ; 1B and 1C)
DATE OF EISA	
DURATION	1 Hour
TOTAL MARKS	50

GUIDELINES TO ASSESORS/MARKERS

- Assessor/marker to evaluate learner responses based on guidelines provided.
- Assessor/marker may consider responses which are not in same verbatim as in the guideline.
- Assessor/marker will draw from their practical industry experience, knowledge, and skills to evaluate learner's response if learners provide responses which are:
    - not in the guideline but are within scope of maintenance planning or
    - over and above what is provided on guideline but are within scope of maintenance. planning.

QUALIFICATION SAQA ID: 101874
ELO 4: Maintain Master Data

Question 1.1 **Maintain Master Data.**

1.1.1 Computerized Maintenance Management Systems (CMMS) have different master data modules which are essential in maintenance planning.

Answer the following:

a) List and explain the functions of master data modules that are in any Computerized Maintenance Management Systems (CMMS). List three (3) examples from any CMMS you are familiar with. **(6)**

Allocate two (2) marks each and up to the total of six (6) marks for listing and explaining each data module in any but not limited to the following:

1. **Equipment data module:**
   - This module contains all data and all the information related to each equipment, such as images, locations, drawings, technical specifications, guarantees, supplier data, etc.

2. **Location data module:**
   - Contains the location tree which contains location of every equipment and establish filters to locate the equipment in any level of the tree/structure.

3. **Maintenance plans module:**
   - This contains the parts of the equipment, the maintenance activities to be performed to each part and the frequency with which they must be done.

4. **Bill of material**
   - It contains all consumable items and replacement components of an asset/equipment

5. **Resources module:**
   - The association of resources with activities consists in establishing the material resources (spare parts and consumables), labour, external services and tools necessary to perform each routine maintenance activity.

6. **Maintenance schedule/calendar module :**
   - Contains and marks the dates when the different maintenance jobs must be performed

7. **Information analysis and reporting module:**
   - **Root cause analysis :** identification of equipment with the most failures, the most frequent types of failures and the root causes which lead to the failure

- **History reports:** related to maintenance management such as costs graphs, stoppages graphs, failures, outages, number of activities performed per month, etc.

b) Show by example how data is created and loaded in master data modules. From the list identified from question 1.1.1 above, use two (2) examples from the maintenance system that you are familiar with. **(10)**

Allocate five (5) marks for each example identified

1. **Allocate one (1) mark and up to the total of five (5) marks for each line item i.e. for identifying part number, manufacturer, quantity, description**

The following example shows how a bill of material can be structured

Equipment Identification and Bill of Material				
EID MTR 001		**EID Description**	Motor , 100 KW Siemens	
Part Number	**Manufacturer**	**Stock item**	**Description**	**Qty**
SMPP X2125	Siemens	100-03-225	Motor ,100 KW	1
Bill of Material				
ES23561	Siemens	100-03-403	Fan	1
ES23443	Siemens	100-03-395	Rotor	1
6220-22rs	SKF	100-03-431	Bearings	2
50/12/70 MS	Angus	100-03-265	Seal	2

2. **Allocate one (1) mark and up to the total of five (5) marks for each line item i.e. for identifying each part, activity and frequency.**

The following example shows how maintenance plan is created

3 PHASE AC MOTOR		
PART	**ACTIVITY**	**FREQUENCY**
Motor frame	Measure temperature	Daily
Motor windings	Measure insulation Measure windings	Every 3 months
Electrical connection	Check hot connections	Every month
	Measure line current	Every week
Bearings	Lubricate	Every six monthly
	Measure temperature	Every week

c) Explain when it is necessary to update master data. List one (1) example to explain your answer. **(2)**

Allocate one (1) mark for explanation for master data update in any but not limited to the following:

- When equipment items are phase out, modified, or a new model is installed this will require update e.g. to maintenance plan, bill of material, supplier, etc.
- Changes in frequency and / or duration of maintenance on equipment
- Results of any analysis carried out on problematic equipment
- Optimised tasks and task lists

Allocate one (1) mark for any of the examples

- Maintenance plan update e.g. new task list added following results of root cause analysis
- Functional location e.g. when there are expansions to existing areas or a new maintenance Functional Location
- Bill of material e.g. there are times when it is necessary to change a component in all bills of material because the component is no longer used

d) Explain the importance of maintaining master data. **(2)**

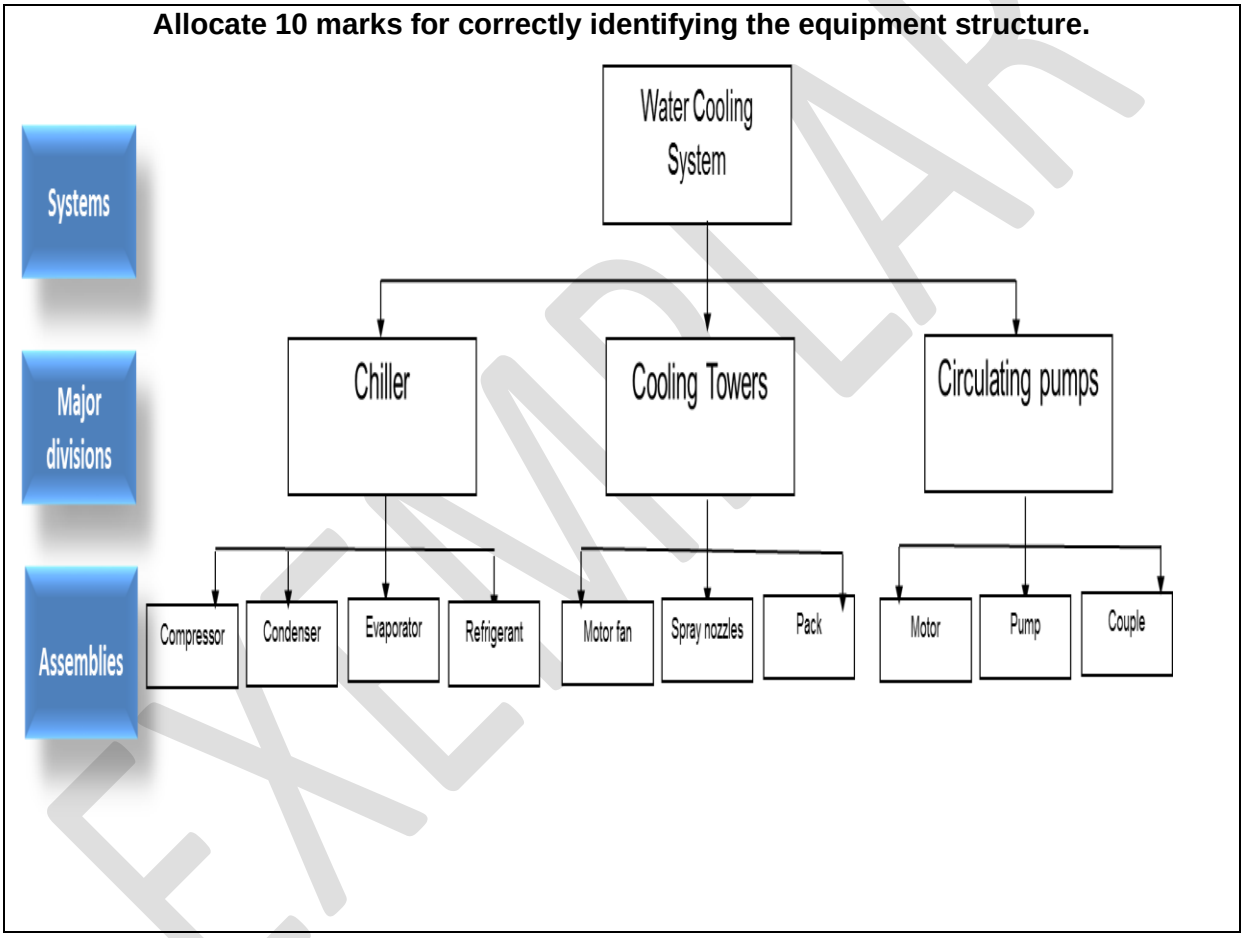
- Ensure data integrity which is needed in order to make informed decisions for effective, efficient maintenance planning and execution.
- Ensure up to date information on supplier details, new replacement models, spare parts availability, maintenance plans, etc.

Question 1.1.2

CMMS are essential in ensuring that there is available and reliable data to assist maintenance staff to execute maintenance tasks correctly and efficiently. Part of this data is loaded in CMMS in terms of how equipment may fail and the related root causes. You are required to identify any equipment / system / assembly you are familiar with and answer the following questions:

a) Formulate the example of the breakdown of all components (tree /structure). **(10)**

Allocate 10 marks for correctly identifying the equipment structure.



b) Show by example and determine functional failure, failure modes and failure causes of each component which will be for future use and guidance for maintenance staff. Show any equipment/components that you are familiar with. **(10)**

Allocate 1 mark for each line item up to total of 10 marks i.e. for identifying each component, functional failure, failure modes and failure cause.

Water Cooling System				
Equipment	**Component**	**Functional failure**	**Failure modes**	**Failure Cause**
Chiller	Compressor	Compressor not circulating gas	No head pressure	Worn rings
	Condenser	No condensation	No heat	Fins blocked
	Evaporator	No evaporations	No cooling	Coil iced
	Refrigerant	No supply pressure	Low pressure	Leaks
Cooling Towers	Motor Fan	Motor failed	Motor Burnt	Bearing seized
	Spray nozzles	No spraying	Blocked	Corroded pipes , poor water treatment
	Pack	No cooling	Worn pack	Foreign objects
Circulating Pump	Motor	Motor not turning	Motor burnt	Overload failed
	Pump	No discharge pressure	Pump seized	Worn bearings
	Coupling	No transfer of rotation	Crack coupling	Misalignment / Vibration

Question 1.1.3 Explain the process to determine task priority **(10)**

.

Allocate two (2) marks for identifying task priority assessment / calculation

Determining task priority is based following decisions:

- Equipment criticality to the operations
- Impact of the task to be done

Task priority = Equipment criticality X Task impact

Allocate four (4) marks categorization of equipment criticality – one (1) mark for each equipment criticality up total of four(4) marks

Equipment criticality can be categorized as follows:

Criticality	Description
5	Critical safety – related system and protective devices
4	Critical to continued production of primary products
3	Support system to production
2	Standby unit in critical system
1	Other support equipment

Allocate four (4) marks for categorization of task impact – one (1) mark for each task impact up total of four(4) marks

Task impact if not corrected can be categorized as follows:

Task Impact	Description
5	Immediate threat to safety of people and plant
4	Limiting operations ability to meet its primary goals
3	Creating hazardous situations for people or machinery
2	Will affect operations after some time if not immediately
1	Improve the efficiency of operation process

TOTAL MARKS FOR THE EXAM: 50

ASSESSOR DETAILS

ASSESSOR NAME & SURNAME	
REGISTRATION NUMBER	
SIGNATURE	
DATE	

INTERNAL MODERATOR DETAILS

MODERATOR NAME & SURNAME	
REGISTRATION NUMBER	
SIGNATURE	
DATE	