**LEARNER SUMMATIVE ASSESSMENT TOOL: KNOWLEDGE MODULE 13: MECHANICAL MAINTENANCE**

**KNOWLEDGE COMPONENT: LEARNER SUMMATIVE ASSESSMENT TOOL: KNOWLEDGE MODULE 13: MECHANICAL MAINTENANCE**

**Occupational Certificate: Sugar Processing Controller**

**LEARNER SUMMATIVE ASSESSMENT TOOL**

**KNOWLEDGE MODULE 13: MECHANICAL MAINTENANCE**

****

**OCCUPATIONAL CERTIFICATE: ID 97590: SUGAR PROCESSING CONTROLLER**

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1. STAKEHOLDER INFORMATION

|  |
| --- |
| **LEARNER INFORMATION** |
| **Name** |  |
| **Surname** |  |
| **ID number** |  |
| **Mobile phone contact number** |  |
| **E-mail address** |  |
| **Physical address** |  |
| **Postal address** |  |
| **Employer Name** |  |
| **Employer Contact Details** |  |

|  |
| --- |
| **ASSESSOR DETAILS** |
| **Name** |  |
| **Surname** |  |
| **Assessor ID** |  |
| **Project Name** | Occupational Certificate ID 97590:Sugar Processing Controller |
| **Module No.** | **Module 13: Mechanical maintenance** |
| **Date of Assessment** |  |
| **Portfolio submission Date** |  |
| **Assessor Signature** |  |
| **Total Marks for Knowledge Module 9** | 90 marks |
| **Marks attained** |  |
| **Place:** |  |

|  |
| --- |
| **MODERATOR DETAILS** |
| **Moderator Name** |  |
| **Moderator ID** |  |
| **Moderator Signature** |  |
| **Date of Moderation** |  |

1. COMPETENCY SUMMARY OF ASSESSMENT

|  |
| --- |
|  |
| **Module 13** | **KM-13-KT01: Mechanical maintenance principles and concepts** | **C** | **NYC** |
| **1** | 1.1. Methods for monitoring and controlling mechanical equipment based on operating parameters |  |  |
|  | 1.2. Maintenance requirements for pumps |  |  |
|  | 1.3. Maintenance requirements for motors |  |  |
|  | 1.4. Maintenance requirements for heating equipment |  |  |
|  | 1.5. Maintenance requirements for cooling equipment |  |  |
| **2** | **KM-13-KT02: Principles of preventative maintenance** | **C** | **NYC** |
|  | 2.1 Scheduling and planning preventative maintenance |  |  |
|  | 2.2. Principle of preventative maintenance |  |  |
|  | 2.3. Reasons for preventative maintenance |  |  |

1. ASSESSMENT ALIGNMENT MATRIX (INTERGRATED OUTCOMES)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Module No: 13** | **How it is assessed (Assessment methodology)** | **Where is it covered (Learning material)** | **Where it is assessed** | **First Submission** |
|  | **Summative** | **Formative** |
| **SAQA ID Number: 97590** | Two methods of assessment are followed which are:1. Summative assessment: written tests, knowledge questions using fundamental and reflexive questions.2. Formative assessment: assignments, tasks, portfolio of evidence submitted and presentations. |  |  |  | **Clearly meets all the criteria** | **Meets some but not all criteria** | **Clearly does not meet any of the criteria** |
| **Title: Mechanical maintenance** |  |  |  |  |  |  |
| **NQF level and credits:****NQF Level 5: 4 Credits** | Page 8 | Question 13.1 page 17 |  |  |  |  |
| **Topic: 1 Mechanical maintenance principles and concepts** | Page 10-29 | Question 13.2-13.4 page 17-18 | Learning Activity 1.1 1.2 page10-15 |  |  |  |
| **Assessment criteria:****The maintenance requirements for mechanical components can be explained** |  | Question 13.8-13.9 page 19 |  |  |  |  |
| Question 13.11,-13.13-13.15 page 21-22 |
| Question 13.17&13.19 page 23 |
| **Topic 2. Principles of preventative maintenance** |  | Page 30-36 | Question 13.5-7 page 18-19 | Learning Activity 2.1 page16-20 |  |  |  |
| Question 13.10 &13.12 page 20-21 |
| Question 13.16 ,13.18% 13.20 page 23-24 |
| **Assessment criteria: The roles and responsibilities of the sugar processing controller in preventative maintenance can be explained and motivated** |  |  |  |  |  |  |

1. ASSESSMENT DECISION & EVIDENCE EVALUATION RECORD

|  |
| --- |
| Candidate's Name: - |
| Assessor's Name: - |
| **Practical assessment**I declare that this assessment is my own demonstration. Marks: The learner is either “Met requirements” or “did not meet requirements”. If the learner did not meet requirements in an area, then he or she must be reassessed. **Learner achieved: Met requirements /Did not meet requirements**  |
| **KNOWLEDGE MODULE 13:** **MECHANICAL MAINTENANCE** |
| **Overall outcome:**  |
| **1** | **Specific Outcome** | **Met requirements** | **Did not meet requirements** | **Comments** |
|  |  |  |  |
| **2** | **Specific outcome** | **Met requirements** | **Did not meet requirements** | **Comments** |
|  |  |  |  |  |

1. OVERALL ASSESSMENT DECISION

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|  |
| **Assessors Comments:** |
| **Signature of Assessor:** |
| **Date:**  |

1. Evidence of feedback

|  |
| --- |
| **Module No : 13****Level :5****Assessor :**……………………………………………………………………………**Candidate :**………………………………………………………………………….. **Date of final assessment:**……………………………………………………………. |
| **Evidence criteria** | **Achieved** | **Not** |
| 1. Constructive |  |  |
| 2. Timeous (according to Plan) |  |  |
| 3. Correct mode / medium |  |  |
| 4. Participative |  |  |
| 5. Developmental |  |  |
| 6. Accurate |  |  |
| 7. Specific |  |  |
| 8. Documented |  |  |
| 9. Directed to correct parties |  |  |
| **Signing off date:** ……………………………………………...........……………. ………………………………….**Assessor Candidate** |

1. OVERALL RESULTS

|  |  |  |
| --- | --- | --- |
| **OVERALL RESULT** | **Competent** |  |
| **Not Yet Competent** |  |
| Declaration by Candidate |
| I, …………………………………………………………………….declare that I am satisfied that the feedback given to me by the Assessor was relevant, sufficient and done in a constructive manner. I accept the assessment decisions and do realise that have no further questions relating to this particular assessment process. I do realise that after this assessment decision, the moderator will either uphold or reverse this assessment decision taken by the assessor. |
| **Candidate : \_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Assessor : \_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Moderator : \_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_** |

1. ASSESSMENT REVIEW

|  |  |  |  |
| --- | --- | --- | --- |
| **Assessor’s Name** |  | **ID Number** |  |
| **Contact Details of Assessor** | **Email** |  |
| **Phone** |  |
| **Fax** |  |
| **PART 1** |
|  | **Review Criteria** | **Valid** | **Authentic** | **Current** | **Consistent** | **Reliable** | **Sufficient** | **Comments** |
| ***Please conduct an honest review of the Assessment Instruments used in this assessment:*** |
| 1 | Evidence Topic 1 |  |  |  |  |  |  |  |
|  | Knowledge Assignment |  |  |  |  |  |  |  |
| Practical Assignment |
| Natural Occurring Evidence |
| Reflection |
| 2 | Evidence Topic 2 |  |  |  |  |  |  |  |
|  | Knowledge Assignment |  |  |  |  |  |  |  |
| Practical Assignment |
| Natural Occurring Evidence |
| Reflection |
| **PART 2** |
| **No** | **Review Criteria** | **Yes** | **No** | **Remarks** |
| 1 | Do you feel the candidate was appropriately selected and prepared for the RPL assessment? |  |  |  |
| 2 | Did the candidate interpret the evidence requirements appropriately? |  |  |  |
| 3 | Was the assessment free of potential assessment barriers such as language, literacy, access to resources? |  |  |  |
| 4 | Was the assessment evidence presented by the candidate valid, authentic, current and sufficient? |  |  |  |
| 5 | Was the candidate’s workplace access to evidence sufficiently supportive of the assessment strategy? |  |  |  |
| 6 | Do you feel you could make a fair, valid and reliable assessment decision? |  |  |  |
| **Recommendations** |
| ***(Feedback on Validity, authenticity, currency and sufficiency of candidate evidence.)*** |
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| **Assessor Signature** | **Date Review Completed** |

1. FINAL DECISION

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| --- |
| **I………………………………………………………. hereby declare Ms/Mr** **………………………………………… Competent Not Yet Competent** |
| **FEEDBACK TO LEARNER:****……………………..………………………..………………………..……………………****……………………..………………………..………………………..………………………****……………………..………………………..………………………..………………………****……………………..………………………..………………………..………………………****SIGN: …………………………………… DATE: ……………………..........................** |
| **LEARNER FEEDBACK:****……………………..………………………..………………………..………………………****……………………..………………………..………………………..………………………****……………………..………………………..………………………..………………………****……………………..………………………..………………………..………………………** **SIGN: ……………………………………… DATE: …………………….......................** |
| **MODERATOR FEEDBACK:****………………………..………………………..………………………..……………………****………………………..………………………..………………………..……………………****……………………..………………………..………………………..………………………****……………………..………………………..………………………..………………………****SIGN: …………………………………… DATE: ……………………........................** |

1. LEARNER FEEDBACK FORM

|  |  |  |  |
| --- | --- | --- | --- |
| **CRITERIA** | **EVIDENCE** | **CRITERIA** | **EVIDENCE** |
| How did your assessor encourage you and put you at ease during the assessment process? |  | Were you given clear and constructive feedback? |  |
| Were your assessor’s questions clear and pitched at the right level of language usage? |  | Did your assessor assess all the evidence provided by you? |  |
| Do you believe that all the assessment criteria and knowledge requirements of the standard you were being measured against were considered in your assessment? |  | Were you aware of any discrimination practice carried out by your assessor towards you? |  |

**LEARNER SIGNATURE:………………………………………………**

**DATE:.…………………………..**

1. SUMMATIVE ASSESSMENT INSTRUCTIONS

**Instructions**

* Work individually and answer all questions.
* Use a black pen and ensure that you complete the questions in your own handwriting.
* Time to spend on this assessment is **1.5hours.**
* The marks you will attain for each question are shown in brackets.
1. WRITTEN ASSESSMENT

**Candidate instruction:** Complete the following multiple-choice questionnaire by marking the most appropriate response with an x in the space provided.

|  |  |  |
| --- | --- | --- |
| **Scope of Assessment** | **Exit Level Outcome/s** | **Module/s** |
|  | 1. : Mechanical maintenance
 | **13** |
| **Alignment – Learning Outcome 1:** **Mechanical maintenance principles and concepts****Award four marks for selection of valid “x”. Four marks = Competent** |

|  |  |  |
| --- | --- | --- |
| **13.1** | **What is the main purpose of regular maintenance?** | **Mark Allocation** |
| **a.** | 🞎 | Reduce overtime costs |  |
| **b.** | 🞎 | Avoid workplace accidents |  |
| **c.** | 🞎 | To ensure that all equipment required for production is operating at 100% efficiency at all times |  |
| **d.** | 🞎 | Keeping equipment clean at all times |  |
| **e.** | 🞎 | Improve safety and quality condition in the factory | **(4)** |

|  |  |  |
| --- | --- | --- |
| **13.2** | **The maintenance program plan cycle has the following components** | **Mark Allocation** |
| **a.** | 🞎 | Plan |  |
| **b.** | 🞎 | Do |  |
| **c.** | 🞎 | Check |  |
| **d.** | 🞎 | Act |  |
| **e.** | 🞎 | All of the above | **(4)** |

|  |  |  |
| --- | --- | --- |
| **13.3** | **In general preventative maintenance includes?** | **Mark Allocation** |
| **a.** | 🞎 | Sharpening of blades as required (or replacement of dull blades) |  |
| **b.** | 🞎 | Thorough cleaning of valves, screens and pipes |  |
| **c.** | 🞎 | Replacement of old, worn or defective seals. |  |
| **d.** | 🞎 | All of the above |  |
| **e.** | 🞎 | None of the above | **(4)** |

|  |  |  |
| --- | --- | --- |
| **13.4** | **The advantages of regular monitoring of pumps are?** | **Mark Allocation** |
| **a.** | 🞎 | The time to maintain the pump set may be predicted and planned more accurately and in a qualified manner in line with predictive and planned maintenance strategies. |  |
| **b.** | 🞎 | No dismantling of the pump is necessary |  |
| **c.** | 🞎 | If a flow meter is installed to measure process liquid flow, then the pump monitor is able to verify the accuracy of the meter readings. |  |
| **d.** | 🞎 | Offers cost savings and energy savings by increasing the pump availability and reliability coefficients for pumps. |  |
| **e.** | 🞎 | All of the above | **(4)** |

|  |  |  |
| --- | --- | --- |
| **13.5** | **The responsibilities of the preventative maintenance planner/scheduler include?** | **Mark Allocation** |
| **a.** | 🞎 | Observe the cooling system’s operation, listen for any unusual noise |  |
| **b.** | 🞎 | Check and make sure all gauges are in proper working order. |  |
| **c.** | 🞎 | Planning emergency work |  |
| **d.** | 🞎 | Clean all condenser tubes. |  |
| **e.** | 🞎 | None of the above | **(4)** |

|  |  |  |
| --- | --- | --- |
| **13.6** | **A planner must focus on arranging the current and future maintenance work as well as allocating the appropriate resources, which planning principle is that?** | **Mark Allocation** |
| **a.** | 🞎 | Planning principle 3 |  |
| **b.** | 🞎 | Planning principle 2 |  |
| **c.** | 🞎 | Planning principle 5 |  |
| **d.** | 🞎 | Planning principle 4 |  |
| **e.** | 🞎 | Planning principle 6 | **(4)** |

|  |  |  |
| --- | --- | --- |
| **13.7** | **What does planning involve?** | **Mark Allocation** |
| **a.** | 🞎 | Acting as a relief supervisor |  |
| **b.** | 🞎 | What you see, expect, know, able to do and taking action |  |
| **c.** | 🞎 | Implementing a successful preventative maintenance program |  |
| **d.** | 🞎 | Setting realistic goals and schedules |  |
| **e.** | 🞎 | Assigning duties to employees | **(4)** |

|  |  |  |
| --- | --- | --- |
| **13.8** | **The following guidelines will help maintain motor controls** | **Mark Allocation** |
| **a.** | 🞎 | Cleanliness |  |
| **b.** | 🞎 | Moving parts inspection |  |
| **c.** | 🞎 | Contact inspection |  |
| **d.** | 🞎 | All of the above |  |
| **e.** | 🞎 | None of the above | **(4)** |

|  |  |  |
| --- | --- | --- |
| **13.9** | **Some important features of cranes that need care in inspection and testing are:** | **Mark Allocation** |
| **a.** | 🞎 | The hook - check for spreading |  |
| **b.** | 🞎 | The brake - does it support the load |  |
| **c.** | 🞎 | Top and bottom limit switches |  |
| **d.** | 🞎 | All of the above |  |
| **e.** | 🞎 | None of the above | **(4)** |

|  |  |  |
| --- | --- | --- |
| **13.10** | **The role of preventative maintenance training is to?** | **Mark Allocation** |
| **a.** | 🞎 | Save money |  |
| **b.** | 🞎 | To encourage autonomous maintenance and ensures that all machine operators and maintenance technicians are familiar with basic maintenance practices such as lubrication of various crucial components. |  |
| **c.** | 🞎 | Reduce maintenance costs |  |
| **d.** | 🞎 | Prolong equipment life |  |
| **e.** | 🞎 | Improve safety and reliability | **(4)** |

**Award one mark for selection of valid “T/F”. One mark = Competent**

|  |  |  |
| --- | --- | --- |
| **13.11** | **True or False: The following are the most important benefits of a properly managed preventive maintenance program.** | **Mark Allocation** |
| **a.** | 🞎 | Equipment downtime is decreased and the number of major repairs are reduced |  |
| **b.** | 🞎 | Better conservation of assets and increased life expectancy of assets, thereby eliminating premature replacement of machinery and equipment. |  |
| **c.** | 🞎 | To reduce accidents due to wear and tear and faulty equipment to zero |  |
| **d.** | 🞎 | Timely, routine repairs lead to fewer large-scale repairs. |  |
| **e.** | 🞎 | Improved safety and quality conditions for everyone in the factory | **(5)** |

|  |  |  |
| --- | --- | --- |
| **13.12** | **True or False: Discipline is?** | **Mark Allocation** |
| **a.** | 🞎 | One of the pillars of preventive maintenance |  |
| **b.** | 🞎 | The second pillar of an effective preventative maintenance |  |
| **c.** | 🞎 | Preventing equipment failure before they occur |  |
| **d.** | 🞎 | Thinking in terms of what you see, expect, know and do  |  |
| **e.** | 🞎 | Identifying job priorities in order of importance | **(5)** |

|  |  |  |
| --- | --- | --- |
| **13.13** | **True or False: The following should be done when the cooling system is shut down?** | **Mark Allocation** |
| **a.** | 🞎 | Clean all condenser tubes |  |
| **b.** | 🞎 | Check and make sure all gauges are in proper working order |  |
| **c.** | 🞎 | Amp-probe drive motors for proper readings |  |
| **d.** | 🞎 | Consider running a fiber optic camera into the condenser tubes to make sure nothing was missed. |  |
| **e.** | 🞎 | Check all valves and piping, observe and list any leaks that will require repair or replacement. | **(5)** |

|  |  |  |
| --- | --- | --- |
| **13.14** | **True or False: The following should be done when the cooling system is running.** | **Mark Allocation** |
| **a.** | 🞎 | Clean all condenser tubes |  |
| **b.** | 🞎 | Check fans for proper balance |  |
| **c.** | 🞎 | Attach A/C gauges and check for proper coolant readings |  |
| **d.** | 🞎 | Clean the outside of the entire chiller and the area around it. |  |
| **e.** | 🞎 | Check all valves and piping, observe and list any leaks that will require repair or replacement. | **(5)** |

|  |  |  |
| --- | --- | --- |
| **13.15** | **True or False: Maintenance checklist for cooling towers includes.** | **Mark Allocation** |
| **a.** | 🞎 | Monitoring and managing water quality |  |
| **b.** | 🞎 | Look for excessive belt ware, check belts for alignment and proper tension. |  |
| **c.** | 🞎 | Check all electrical wiring for loose or discolored connections. |  |
| **d.** | 🞎 | Check and clean all water nozzles that feed the return condenser water to the towers. |  |
| **e.** | 🞎 | Inspecting Insulation | **(5)** |

|  |  |  |
| --- | --- | --- |
| **13.16** | **True or False; there are -----planning preventative maintenance principles?** | **Mark Allocation** |
| **a.** | 🞎 | 1 |  |
| **b.** | 🞎 | 3 |  |
| **c.** | 🞎 | 6 |  |
| **d.** | 🞎 | 8 |  |
| **e.** | 🞎 | 5 | **(5)** |

|  |  |  |
| --- | --- | --- |
| **13.17** | **True or False: boiler maintenance involves?** | **Mark Allocation** |
| **a.** | 🞎 | Cleaning |  |
| **b.** | 🞎 | Blowdown |  |
| **c.** | 🞎 | Monitor and Manage Water Quality |  |
| **d.** | 🞎 | Inspect Insulation |  |
| **e.** | 🞎 | Maintain Accurate Service/Maintenance Logs | **(5)** |

|  |  |  |
| --- | --- | --- |
| **13.18** |  **True or False: The reasons for preventative maintenance are?** | **Mark Allocation** |
| **a.** | 🞎 | To consider equipment maintenance history |  |
| **b.** | 🞎 | To save money |  |
| **c.** | 🞎 | To measure performance |  |
| **d.** | 🞎 | To maximize efficiency |  |
| **e.** | 🞎 | To reduce maintenance costs | **(5)** |

|  |  |  |
| --- | --- | --- |
| **13.19** | **True or False: the following performance parameters are tested during specialized tests.** | **Mark Allocation** |
| **a.** | 🞎 | Vibration analysis and diagnostics |  |
| **b.** | 🞎 | Lubricant analysis. |  |
| **c.** | 🞎 | Removal of scale and rust |  |
| **d.** | 🞎 | Ultrasound testing (material thickness/flaw testing) |  |
| **e.** | 🞎 | Re-welding of joins that have weakened | **(5)** |

|  |  |  |
| --- | --- | --- |
| **13.20** | **True or False: Principles of preventative maintenance include** | **Mark Allocation** |
| **a.** | 🞎 | Planning |  |
| **b.** | 🞎 | Maximising efficiency |  |
| **c.** | 🞎 | Discipline |  |
| **d.** | 🞎 | Preventive Maintenance Training |  |
| **e.** | 🞎 | Maintenance of boilers | **(5)** |

1. FINAL MARKS

**TOTAL MARKS: 90**

**PASS MARK: 72**

|  |  |
| --- | --- |
| **LEARNER MARKS** |  |
| **PERCENTAGE** |  |
| **ASSESSOR SIGNATURE:** |