**LEARNER SUMMATIVE ASSESSMENT TOOL : KNOWLEDGE MODULE 4:**

**KNOWLEDGE COMPONENT: LEARNER SUMMATIVE ASSESSMENT TOOL KNOWLEDGE MODULE 4:**

**SUGAR JUICE EXTRACTION**

**Occupational Certificate: Sugar Processing Controller**

**LEARNER SUMMATIVE ASSESSMENT TOOL**

**KNOWLEDGE MODULE 4: SUGAR JUICE EXTRACTION**

**SUGAR JUICE EXTRACTION**

 ****

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

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**TABLE OF CONTENTS**

[1. STAKEHOLDER INFORMATION 6](#_Toc8631650)

[2. COMPETENCY SUMMARY OF ASSESSMENT 8](#_Toc8631651)

[3. ASSESSMENT ALIGNMENT MATRIX (INTERGRATED OUTCOMES) 9](#_Toc8631652)

[4. ASSESSMENT DECISION & EVIDENCE EVALUATION RECORD 10](#_Toc8631653)

[5. OVERALL ASSESSMENT DECISION 11](#_Toc8631654)

[6. EVIDENCE OF FEEDBACK 12](#_Toc8631655)

[7. OVERALL RESULTS 13](#_Toc8631656)

[8. ASSESSMENT REVIEW 14](#_Toc8631657)

[9. FINAL DECISION 16](#_Toc8631658)

[10. LEARNER FEEDBACK FORM 17](#_Toc8631659)

[11. SUMMATIVE ASSESSMENT INSTRUCTIONS 18](#_Toc8631660)

[12. WRITTEN ASSESSMENT 19](#_Toc8631661)

[13. FINAL MARKS 45](#_Toc8631662)

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 4: Sugar Juice Extraction** |
| **Date of Assessment** |  |
| **Portfolio submission Date** |  |
| **Assessor Signature** |  |
| **Total Marks for Knowledge Module 4** | 220 marks |
| **Marks attained** |  |
| **Place:** |  |

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

1. COMPETENCY SUMMARY OF ASSESSMENT

|  |
| --- |
|  |
| **Module 4** | **KM-04-KT01:** Raw product handling and processing | **C** | **NYC** |
| **1** | 1.1. An understanding of process steps and use of equipment related to raw product handling can be demonstrated |  |  |
| **2** | **KM-04-KT02:** : Raw product handling and processing problem solving | **C** | **NYC** |
|  | 2.1 An understanding of trouble shooting and standard responses related to raw product handling and processing can be demonstrated. |  |  |

1. ASSESSMENT ALIGNMENT MATRIX (INTERGRATED OUTCOMES)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Module No: 4** | **How it is assessed (Assessment methodology)** | **Where is it covered in the 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: Sugar Juice Extraction** |  |  |  |  |  |  |
| **NQF level and credits:**NQF Level 4: 4 Credits |  |  |  |  |  |  |
| **Topic: 1** Raw product handling and processing | Page 12-114 | Question 4.1 – 4.33 page 19-29 | Learning activity 1.1-1.8 page 10-37 |  |  |  |
| **Assessment criteria**: An understanding of process steps and use of equipment related to raw product handling can be demonstrated | Question 36-43 page 19 |  |  |  |
| Question 4.45-4.77 page 33-45 |
| **Topic 2.** Raw product handling and processing problem solving |  | Question 34 page 29Question 44 page 32 | Learning activity 2.1 page 38-42 |  |  |  |
| **Assessment criteria:**  An understanding of trouble shooting and standard responses related to raw product handling and processing can be demonstrated. |  |  |  |  |  |

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 4:SUGAR JUICE EXTRACTION** |
| **Overall outcome:**  |
| **Specific Outcome** | **Met requirements** | **Did not meet requirements** | **Comments** |
| 1 |  |  |  |  |
| **Specific Outcome** | **Met requirements** | **Did not meet requirements** | **Comments** |
| 2 |  |  |  |  |
|  | **Specific outcome** | **Met requirements** | **Did not meet requirements** | **Comments** |
| 3 |  |  |  |  |
|  | **Specific outcome** | **Met requirements** | **Did not meet requirements** | **Comments** |
| 4 |  |  |  |  |
| 5 | **Specific outcome** | **Met requirements** | **Did not meet requirements** | **Comments** |
|  |  |  |  |  |

1. OVERALL ASSESSMENT DECISION

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

1. EVIDENCE OF FEEDBACK

|  |
| --- |
| **Module No : 4****Level : 4** **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 |
| 3 | Evidence Topic 3 |  |  |  |  |  |  |  |
|  | Knowledge Assignment |  |  |  |  |  |  |  |
| Practical Assignment |
| Natural Occurring Evidence |
| Reflection |
| 4 | Evidence Topic 4 |  |  |  |  |  |  |  |
|  | Knowledge Assignment |  |  |  |  |  |  |  |
|  | Practical Assignment |
|  | Natural Occurring Evidence |
|  | Reflection |
| 5 | Evidence Topic 5 |  |  |  |  |  |  |  |
|  | Knowledge Assignment |  |
|  | Practical Assignment |
|  | Natural Occurring Evidence |  |
|  | Reflection |  |
|  | Historical Evidence Location Grid |  |  |  |  |  |  |  |
| CCFO Location Grid |
| **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

|  |
| --- |
| **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 **2 hours.**
* The marks you will attain for each question are shown in brackets.
1. WRITTEN ASSESSMENT

|  |  |  |
| --- | --- | --- |
| **Scope of Assessment** | **Exit Level Outcome/s** | **Module/s** |
|  | 1. Juice Extraction
 | **4** |
| **Alignment – Learning Outcome 1:** Cane Preparation and Milling |
| **Award one mark for selection of valid “x”. One mark = Competent**  |

|  |  |  |
| --- | --- | --- |
| **4.1** | **What is the correct definition of Brix?** | **Mark Allocation** |
| **a.** | 🞎 | Total dissolved and undissolved solids. |  |
| **b.** | 🞎 | Total sucrose and pol. |  |
| **c.** | 🞎 | Total dissolved solids. |  |
| **d.** | 🞎 | Purity. |  |
| **e.** | 🞎 | Disaccharide. |  2 |

|  |  |  |
| --- | --- | --- |
| **4.2** | **Where are the cells that contain the rich juices found in the sugarcane stalk?** | **Mark Allocation** |
| **a.** | 🞎 | Rind. |  |
| **b.** | 🞎 | Parenchyma cells. |  |
| **c.** | 🞎 | Vascular bundles. |  |
| **d.** | 🞎 | Epidermis. |  |
| **e.** | 🞎 | Strengthening tissue. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.3** | **Where are the low purity juices found in the sugarcane stalk?** | **Mark Allocation** |
| **a.** | 🞎 | Rind. |  |
| **b.** | 🞎 | Parenchyma cells. |  |
| **c.** | 🞎 | Vascular bundles. |  |
| **d.** | 🞎 | Epidermis. |  |
| **e.** | 🞎 | Strengthening tissue. | 2 |
| **4.4** | **What is the main reason for the cane being weighed as it enters the mill?** | **Mark Allocation** |
| **a.** | 🞎 | To report on the total product coming into the mill. |  |
| **b.** | 🞎 | To calculate the cane payment for each grower. |  |
| **c.** | 🞎 | To report on the tons of cane in the cane yard. |  |
| **d.** | 🞎 | All the above. |  |
| **e.** | 🞎 | None of the above. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.5** | **What is the main purpose of the cane yard?** | **Mark Allocation** |
| **a.** | 🞎 | To store cane in bundles. |  |
| **b.** | 🞎 | To act as a buffer so that crushing can be continuous. |  |
| **c.** | 🞎 | To store local farmers’ cane. |  |
| **d.** | 🞎 | To keep the consignments separate for cane testing. |  |
| **e.** | 🞎 | All the above. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.6** | **Why is it important to keep the identity of the consignment until after the shredder?** | **Mark Allocation** |
| **a.** | 🞎 | The farmer will be identified if there is damage to the mill due to something in the cane. |  |
| **b.** | 🞎 | To know which farmer is sending in poor quality cane. |  |
| **c.** | 🞎 | For unique sampling and analysis for cane payment purposes. |  |
| **d.** | 🞎 | All the above. |  |
| **e.** | 🞎 | None of the above. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.7** | **What does “slat and rake” refer to?** | **Mark Allocation** |
| **a.** | 🞎 | Cane feed table types. |  |
| **b.** | 🞎 | Cane main carrier types. |  |
| **c.** | 🞎 | Shredder carrier types. |  |
| **d.** | 🞎 | Intercarrier types. |  |
| **e.** | 🞎 | Cane knife carrier types. | 2 |
| **4.8** | **What needs to be removed from the cane to prevent damage to the mill?** | **Mark Allocation** |
| **a.** | 🞎 | Trash and tops. |  |
| **b.** | 🞎 | Sand. |  |
| **c.** | 🞎 | Tramp iron. |  |
| **d.** | 🞎 | All the above. |  |
| **e.** | 🞎 | None of the above. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.9** | **What is the definition of bulk density?** | **Mark Allocation** |
| **a.** | 🞎 | The amount of cane on the feeder table. |  |
| **b.** | 🞎 | The volume of cane in the cane knife house. |  |
| **c.** | 🞎 | The mass of cane in the cane yard. |  |
| **d.** | 🞎 | The mass of cane crushed per hour. |  |
| **e.** | 🞎 | None of the above. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.10** | **In cane preparation, there is a specific requirement for diffusers. What is this requirement and how is it achieved?** | **Mark Allocation** |
| **a.** | 🞎 | Course 3-stage knifing and shredding producing a matt of uniform thickness. |  |
| **b.** | 🞎 | Increasing the bulk density of the cane. |  |
| **c.** | 🞎 | Fine 3-stage knifing and course shredding producing string-like fibres. |  |
| **d.** | 🞎 | Reduced role of knifing and fine shredding resulting in string-like fibres. |  |
| **e.** | 🞎 | No knifing, only the leveller knives and fine shredding resulting in a matt of uniform thickness, | 2 |

|  |  |  |
| --- | --- | --- |
| **4.11** | **There are several factors that needs to be considered when designing a knife set, like crushing rate and fibre content of the cane. What is the general power requirement for a typical 3-knife set?** | **Mark Allocation** |
| **a.** | 🞎 | 5 kW/tfh. |  |
| **b.** | 🞎 | 30 kW/tfh. |  |
| **c.** | 🞎 | 100 kW/tfh. |  |
| **d.** | 🞎 | 15 kW/tfh. |  |
| **e.** | 🞎 | 50 kW/tfh. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.12** | **Where is the sucrose % higher when measured just after the shredder?** | **Mark Allocation** |
| **a.** | 🞎 | In the juice. |  |
| **b.** | 🞎 | In the pith or fine particles. |  |
| **c.** | 🞎 | In the larger particles. |  |
| **d.** | 🞎 | In the rind. |  |
| **e.** | 🞎 | In the fibre. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.13** | **Where is the sucrose % higher when measured in bagasse (milling and diffusion)?** | **Mark Allocation** |
| **a.** | 🞎 | In the juice. |  |
| **b.** | 🞎 | In the pith or fine particles. |  |
| **c.** | 🞎 | In the larger particles. |  |
| **d.** | 🞎 | In the rind. |  |
| **e.** | 🞎 | In the fibre. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.14** | **What is the correct definition of a shredder washboard?** | **Mark Allocation** |
| **a.** | 🞎 | A moveable section of the shredder, covering 90 degrees of the circumference, housing anvils that are positioned close to the hammer tip. |  |
| **b.** | 🞎 | A moveable section of the shredder, covering 75 degrees of the circumference, housing anvils that are positioned close to the hammer tip. |  |
| **c.** | 🞎 | A moveable section of the shredder, covering 90 degrees of the circumference, housing hammers that are positioned close to the anvils. |  |
| **d.** | 🞎 | A static section of the shredder, covering 90 degrees of the circumference, housing anvils that are positioned close to the hammer tip. |  |
| **e.** | 🞎 | A moveable section of the shredder, covering 180 degrees of the circumference, housing anvils that are positioned close to the hammer tip. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.15** | **What would be the general power requirement for a cane preparation unit (cane knives and shredder)?** | **Mark Allocation** |
| **a.** | 🞎 | 5 kW/tfh. |  |
| **b.** | 🞎 | 30 kW/tfh. |  |
| **c.** | 🞎 | 100 kW/tfh. |  |
| **d.** | 🞎 | 15 kW/tfh. |  |
| **e.** | 🞎 | 50 kW/tfh. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.16** | **What would the total weight of all the shredder hammers in a typical Tongaat type shredder be?**  | **Mark Allocation** |
| **a.** | 🞎 | 20 kg. |  |
| **b.** | 🞎 | 200 kg. |  |
| **c.** | 🞎 | 150 kg. |  |
| **d.** | 🞎 | 4 000 kg. |  |
| **e.** | 🞎 | 2 000 kg. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.17** | **What is the process of milling?** | **Mark Allocation** |
| **a.** | 🞎 | A solid – liquid separation process. |  |
| **b.** | 🞎 | Extraction process. |  |
| **c.** | 🞎 | Provide juice to the factory. |  |
| **d.** | 🞎 | Squeezing the juice out if the cane. |  |
| **e.** | 🞎 | All the above. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.18** | **What is the purpose of having grooves in the mill roll?** | **Mark Allocation** |
| **a.** | 🞎 | To increase capacity. |  |
| **b.** | 🞎 | To provide a passage for the juice to flow. |  |
| **c.** | 🞎 | To improve gripping on the cane. |  |
| **d.** | 🞎 | To improve extraction. |  |
| **e.** | 🞎 | All the above. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.19** | **What is the correct definition of circumferential grooving?** | **Mark Allocation** |
| **a.** | 🞎 | Grooves are cut into the circumference of the roll in a spiral. |  |
| **b.** | 🞎 | Identical individual grooves cut into the circumference of the mill roll across the entire length. |  |
| **c.** | 🞎 | Identical grooves cut into the length of the roll. |  |
| **d.** | 🞎 | Additional grooves cut either between grooves or in place of grooves. |  |
| **e.** | 🞎 | Additional groves cut into a wide ‘V’ shape across the length of the roll. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.20** | **What is the correct definition of Messchaert grooving?** | **Mark Allocation** |
| **a.** | 🞎 | Grooves are cut into the circumference of the roll in a spiral. |  |
| **b.** | 🞎 | Identical individual grooves cut into the circumference of the mill roll across the entire length. |  |
| **c.** | 🞎 | Identical grooves cut into the length of the roll. |  |
| **d.** | 🞎 | Additional deep grooves cut either between grooves or in place of grooves. |  |
| **e.** | 🞎 | Additional groves cut into a wide ‘V’ shape across the length of the roll. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.21** | **What is the purpose of the trashplate?**  | **Mark Allocation** |
| **a.** | 🞎 | To prevent bagasse from falling into the juice. |  |
| **b.** | 🞎 | To turn the bagasse into the discharge nip. |  |
| **c.** | 🞎 | To scrape the bagasse out of the top roll. |  |
| **d.** | 🞎 | To assist with extraction. |  |
| **e.** | 🞎 | All the above. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.22** | **The weight of the top roll exerts a pressure of 0,25 NM on the bagasse. This is inadequate for extraction. What pressure is required and how is this applied?** | **Mark Allocation** |
| **a.** | 🞎 | A pressure of 25 and 35 MPa delivered by atmospheric pressure. |  |
| **b.** | 🞎 | A pressure of 15 to 30 MPa delivered by hydraulic rams. |  |
| **c.** | 🞎 | A pressure of 6 to 12 NM that is delivered by hydraulic rams. |  |
| **d.** | 🞎 | A pressure of 6 to 12 MPa that is delivered by hydraulic rams. |  |
| **e.** | 🞎 | A pressure of 6 to 12 NM that is delivered by pressurised nitrogen. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.23** | **What is meant by the term Mill Lift?** | **Mark Allocation** |
| **a.** | 🞎 | Approximately 25mm from the bottom position. |  |
| **b.** | 🞎 | A force that exerts pressure on the discharge roll. |  |
| **c.** | 🞎 | The indication on a gauge when the mill is not working. |  |
| **d.** | 🞎 | The lift of the top roll caused by the pressure of the bagasse. |  |
| **e.** | 🞎 | When the top roll is lifted from the mill by the crane. | 2 |
| **4.24** | **What is the definition of work opening?**  | **Mark Allocation** |
| **a.** | 🞎 | Work opening = set opening under operational conditions. |  |
| **b.** | 🞎 | Work opening = set opening – 0,8 X Mill Lift. |  |
| **c.** | 🞎 | Work opening = 10 mm from the discharge nip and feed nip. |  |
| **d.** | 🞎 | Work opening = Set opening under non-operational conditions. |  |
| **e.** | 🞎 | Work opening = Kf – Kd X M. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.25** | **Mill rolls are continually arced. What is the purpose of this?** | **Mark Allocation** |
| **a.** | 🞎 | Maintain a rough roller surface. |  |
| **b.** | 🞎 | Prevent mill slippage. |  |
| **c.** | 🞎 | Extend the life of the roll shell. |  |
| **d.** | 🞎 | All the above. |  |
| **e.** | 🞎 | None of the above. | 2 |

|  |  |  |
| --- | --- | --- |
| **4.26** | **What are the needs for the 5-roller mill drive system?** | **Mark Allocation** |
| **a.** | 🞎 | Small yet powerful. |  |
| **b.** | 🞎 | High speed. |  |
| **c.** | 🞎 | No maintenance. |  |
| **d.** | 🞎 | All the above. |  |
| **e.** | 🞎 | None of the above. | 2 |

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| **4.27** | **What is the correct statement for the operation of a milling tandem?**  | **Mark Allocation** |
| **a.** | 🞎 | A set of 3 and/or 5 roller mills that are fed with cane in parallel, extracting juice for the factory and bagasse for the boilers. |  |
| **b.** | 🞎 | A set of 5, 6 or 7 mills that are fed with cane in parallel, extracting juice for the factory and bagasse for the boilers. |  |
| **c.** | 🞎 | A set of 5,6 or 7 mills that are fed with cane in series, extracting juice for the factory and bagasse for the boilers. |  |
| **d.** | 🞎 | A set of 5,6 or 7 mills that are fed with cane in series. Juice from each mill is fed onto the bagasse of the previous mill. Juice from the first two mills is sent for processing. |  |
| **e.** | 🞎 | A set of 5,6 or 7 mills that are fed with cane in parallel. Juice from each mill is fed onto the bagasse of the previous mill. Juice from the first two mills is sent for processing. | 2 |

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| **4.28** | **Juice extracted from mills 4, 5, 6 and 7 is pumped onto the bagasse from the previous mill prior to extraction and water is pumped onto the bagasse prior to the last mill. What is this process called?**  | **Mark Allocation** |
| **a.** | 🞎 | Tandem extraction. |  |
| **b.** | 🞎 | Series Extraction. |  |
| **c.** | 🞎 | Compound imbibition. |  |
| **d.** | 🞎 | Simple imbibition. |  |
| **e.** | 🞎 | Milling. | 2 |

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| **4.29** | **How much water (imbibition) can be pumped onto the bagasse before the final mill?** | **Mark Allocation** |
| **a.** | 🞎 | As much as possible, limited by the ability of the factory to evaporate the water. |  |
| **b.** | 🞎 | Not more than 250 % on fibre in bagasse, otherwise the fibre will become like plastic. |  |
| **c.** | 🞎 | Not more than 650 % on fibre in bagasse, otherwise the bagasse will not be able to absorb any more water. |  |
| **d.** | 🞎 | Between 250 % and 350 % on fibre in bagasse is optimal for best extraction results. |  |
| **e.** | 🞎 | Between 350 % and 450 % on fibre in bagasse is optimal for best extraction results. | 2 |

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| **4.30** | **How is the performance of an individual mill usually measured?**  | **Mark Allocation** |
| **a.** | 🞎 | Pol extraction. |  |
| **b.** | 🞎 | Brix extraction. |  |
| **c.** | 🞎 | Moisture extraction. |  |
| **d.** | 🞎 | Fibre extraction |  |
| **e.** | 🞎 | All the above. | 2 |

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| **4.31** | **What is the formula for tandem extraction?**  | **Mark Allocation** |
| **a.** | 🞎 | Tons mixed juice – tons cane + tons bagasse. |  |
| **b.** | 🞎 | Tons pol in mixed juice / tons pol in cane X 100. |  |
| **c.** | 🞎 | Tons pol in cane / tons pol in mixed juice X 100. |  |
| **d.** | 🞎 | Tons cane + tons bagasse – tons mixed juice. |  |
| **e.** | 🞎 | Tons pol in bagasse / tons pol in mixed juice X 100. | 2 |

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| **4.32** | **What is the correct definition for Corrected Reduced Extraction (CRE)?** | **Mark Allocation** |
| **a.** | 🞎 | Extraction corrected for the suspended solids in mixed juice. |  |
| **b.** | 🞎 | Extraction corrected for mill performance. |  |
| **c.** | 🞎 | Extraction corrected for pol % bagasse. |  |
| **d.** | 🞎 | Extraction corrected for cane with fibre of 15,5% and pol of 13,0%. |  |
| **e.** | 🞎 | Extraction corrected for cane with fibre of 15,0% and pol of 13,5%. | 2 |

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| **4.33** | **The speed of the extraction unit is usually controlled by:**  | **Mark Allocation** |
| **a.** | 🞎 | The level in the Donnelly chute. |  |
| **b.** | 🞎 | The first mill. |  |
| **c.** | 🞎 | The last mill |  |
| **d.** | 🞎 | The shredder feeder. |  |
| **e.** | 🞎 | The main carrier. | 2 |

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| **4.34** | **If a mill crushes 100 tons of cane on one day and produces 120 tons of mixed juice and 30 tons of bagasse, how many tons of water were added?** | **Mark Allocation** |
| **a.** | 🞎 | 100 tons. |  |
| **b.** | 🞎 | 50 tons. |  |
| **c.** | 🞎 | 120 tons. |  |
| **d.** | 🞎 | 220 tons. |  |
| **e.** | 🞎 | 250 tons. | 2 |

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| **4.35** | **Which of the following relationships is correct when comparing cane purity to mixed juice purity on a milling tandem?** | **Mark Allocation** |
| **a.** | 🞎 | Cane purity = 86,50 : Mixed juice purity = 88,50. |  |
| **b.** | 🞎 | Cane purity = 84,50 : Mixed juice purity = 85,50. |  |
| **c.** | 🞎 | Cane purity = 86,00 : Mixed juice purity = 86,00. |  |
| **d.** | 🞎 | Cane purity = 83,25 : Mixed juice purity = 85,50. |  |
| **e.** | 🞎 | Cane purity = 84,75 : Mixed juice purity = 83,75. | 2 |

**TRUE OR FALSE QUESTIONS**

**Award one mark for selection of valid “x”. One mark = Competent**

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| **4.36** | **TRUE or FALSE: State which statements are true and which are false with reference to the composition of sugarcane.** | **Mark Allocation** |
| **a.** | 🞎 | Contains about 15 % water. |  |
| **b.** | 🞎 | Contains about 15 % Fibre. |  |
| **c.** | 🞎 | Contains about 5 % gums. |  |
| **d.** | 🞎 | Contains about 13 % sucrose. |  |
| **e.** | 🞎 | Contains about 15 % dissolved substances. | 5 |

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| **4.37** | **TRUE or FALSE: There are several cane offloading mechanisms to deal with cane delivered to the mill. State which are true and which are false.** | **Mark Allocation** |
| **a.** | 🞎 | Dummy spiller. |  |
| **b.** | 🞎 | Tippler. |  |
| **c.** | 🞎 | Overhead gantry crane. |  |
| **d.** | 🞎 | Push piling. |  |
| **e.** | 🞎 | Bucket elevator. | 5 |

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| **4.38** | **TRUE or FALSE: State which purposes of cane shredding are true and which are false.** | **Mark Allocation** |
| **a.** | 🞎 | To increase the capacity of the extraction plant by increasing the bulk density of the feed. |  |
| **b.** | 🞎 | To remove the trash and tops to improve the extraction. |  |
| **c.** | 🞎 | To assist extraction by breaking down the structure of the cane. |  |
| **d.** | 🞎 | To reduce the impact of fibre on the extraction plant by breaking down the structure of the fibre. |  |
| **e.** | 🞎 | To render the juice in the cane more available for the action of imbibition. | 5 |

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| **4.39** | **TRUE or FALSE: There are either turbine or electric drives for shredders in the industry. State which of these statements are true and which are false.** | **Mark Allocation** |
| **a.** | 🞎 | A turbine drive has good speed/torque characteristics. |  |
| **b.** | 🞎 | An electric drive has a higher capital cost of installation. |  |
| **c.** | 🞎 | The electric drives have a lower maintenance cost. |  |
| **d.** | 🞎 | A turbine drive has more complex operating procedures, especially at start-up. |  |
| **e.** | 🞎 | Electric drives are easier to control remotely. | 5 |

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**Figure 1 above depicts a typical 5-roller mill. Use the diagram to answer the following two questions.**

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| **4.40** | **TRUE or FALSE: Refer to Figure 1.** | **Mark Allocation** |
| **a.** | 🞎 | The Donnelly chute is shown as number 2. |  |
| **b.** | 🞎 | The feed roll is shown as number 6. |  |
| **c.** | 🞎 | The trashplate is number 11. |  |
| **d.** | 🞎 | The feed nip is number 9.  |  |
| **e.** | 🞎 | The trashbar is number 12. | 5 |

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| **4.41** | **TRUE or FALSE: Refer to Figure 1.** | **Mark Allocation** |
| **a.** | 🞎 | The discharge roll is number 6. |  |
| **b.** | 🞎 | The pressure feeder is number 9. |  |
| **c.** | 🞎 | The hydraulic accumulator is number 5. |  |
| **d.** | 🞎 | The deflector plate is number 1. |  |
| **e.** | 🞎 | The discharge nip is number 10. | 5 |

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| **4.42** | **TRUE or FALSE: If the rollers in a mill are set properly and in accordance with the mill setting calculations, this will result in the following outcomes.** | **Mark Allocation** |
| **a.** | 🞎 | A lower moisture % bagasse. |  |
| **b.** | 🞎 | A higher pol % bagasse. |  |
| **c.** | 🞎 | Improved throughput. |  |
| **d.** | 🞎 | Better extraction. |  |
| **e.** | 🞎 | Fewer suspended solids in mixed juice. | 5 |

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| **4.43** | **TRUE or FALSE: Mill drives can be steam turbines or electric motors. Which statements are true and which are false when considering mill drives?** | **Mark Allocation** |
| **a.** | 🞎 | A steam turbine has better starting torque than an electric drive. |  |
| **b.** | 🞎 | An electric drive is easier to control remotely than a steam turbine. |  |
| **c.** | 🞎 | A steam turbine provides poor exhaust steam for the factory. |  |
| **d.** | 🞎 | A steam turbine has lower maintenance costs than an electric motor. |  |
| **e.** | 🞎 | An electric drive does not require any steam piping. | 5 |

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| **4.44** | **TRUE or FALSE: A mill turbine runs at 5400 revolutions per minute (rpm) with reduction gear ratios of:****1st gear 12:1****2nd gear 12:1****3rd gear 5:1****4th gear 3:1****State true or false for the following statements.** | **Mark Allocation** |
| **a.** | 🞎 | The 1st gear output will be 450 rpm. |  |
| **b.** | 🞎 | The 1st gear output will be 37,5 rpm. |  |
| **c.** | 🞎 | The 2rd gear output will be 7,5 rpm. |  |
| **d.** | 🞎 | The 3nd gear output will be 7,5 rpm. |  |
| **e.** | 🞎 | The final drive speed will be 2,5 rpm. | 5 |

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| **4.45** | **TRUE or FALSE: There are several factors that affect the capacity of a milling tandem. State which are true and which are false.** | **Mark Allocation** |
| **a.** | 🞎 | Design and condition of the plant. Poorly maintained equipment will reduce capacity and efficiency. |  |
| **b.** | 🞎 | Tons of cane that need to be crushed for the season.  |  |
| **c.** | 🞎 | The amount of reabsorption. The higher the better. |  |
| **d.** | 🞎 | A 7-mill tandem will perform better than a 5-mill tandem. |  |
| **e.** | 🞎 | Well maintained preparation equipment will make no difference to the performance of the mill. | 5 |

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| **4.46** | **TRUE or FALSE: There are several performance indicators used to monitor the mill performance. State which are true and which are false.** | **Mark Allocation** |
| **a.** | 🞎 | Reabsorption. |  |
| **b.** | 🞎 | Separation efficiency. |  |
| **c.** | 🞎 | Tons water per hour. |  |
| **d.** | 🞎 | Brix extraction. |  |
| **e.** | 🞎 | Solids % mixed juice. | 5 |

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| **4.47** | **TRUE or FALSE: State which is true and which is false when talking about Leuconostoc Mesenteriods.** | **Mark Allocation** |
| **a.** |  | Leuconostoc Mesenteriods are bacteria that are present in all cane juices and used sucrose to produce Dextran. |  |
| **b.** |  | Leuconostoc Mesenteriods is treated with milk of lime. |  |
| **c.** |  | Leuconostoc Mesenteriods can be destroyed by temperatures higher than 43 oC and washing of stagnant pools of juice with hot water. |  |
| **d.** |  | Leuconostoc Mesenteriods cannot exist in the individual mills because of the constant movement of juice and bagasse. |  |
| **e.** |  | Dextran, produced by Leuconostoc Mesenteriods will not cause serious problems in the downstream processes. | 5 |

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| **Scope of Assessment** | **Exit Level Outcome/s** |
|  | **2**. Juice Extraction |
| **Alignment – Learning Outcome 2**: **Cane Diffusion and Juice Screening****Award one mark for selection of valid “x”. One mark = Competent** |
| **4.48** | **The process where Brix moves from the cell through the unbroken cell membrane to the surrounding liquid until the concentration is the same inside the cell and the surrounding liquid is known as:** | **Mark Allocation** |
| **a.** | 🞎 | Diffusion. |  |
| **b.** | 🞎 | Displacement. |  |
| **c.** | 🞎 | Permeable leaching. |  |
| **d.** | 🞎 | Mixing. |  |
| **e.** | 🞎 | True diffusion. | 2 |

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| **4.49** | **The process where water moves into the broken cells and Brix moves out of the broken cells into the surrounding liquid until the concentration is the same inside the cell and the surrounding liquid is known as:** | **Mark Allocation** |
| **a.** | 🞎 | Diffusion. |  |
| **b.** | 🞎 | Displacement. |  |
| **c.** | 🞎 | Permeable leaching. |  |
| **d.** | 🞎 | Mixing. |  |
| **e.** | 🞎 | True diffusion. | 2 |

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| **4.50** | **The process where water enters the broken cells and displaces an equal volume of juice out of the cells into the surrounding liquid until the concentration is the same inside the cell and the surrounding liquid is known as:** | **Mark Allocation** |
| **a.** | 🞎 | Diffusion. |  |
| **b.** | 🞎 | Displacement. |  |
| **c.** | 🞎 | Permeable leaching. |  |
| **d.** | 🞎 | Mixing. |  |
| **e.** | 🞎 | True diffusion. | 2 |

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| **4.51** | **The diffuser is a long rectangular vessel or tank. Prepared cane moves slowly through the diffuser. The system where the cane falls onto a moving perforated bed and passes through the diffuser is known as:** | **Mark Allocation** |
| **a.** | 🞎 | Bagasse Diffuser. |  |
| **b.** | 🞎 | B.M.A. Diffuser. |  |
| **c.** | 🞎 | Van Hengel Diffuser. |  |
| **d.** | 🞎 | Burnett Diffuser. |  |
| **e.** | 🞎 | de Smet Diffuser. | 2 |

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| **4.52** | **The diffuser is a long rectangular vessel or tank. Prepared cane moves slowly through the diffuser. The system where the cane falls onto a fixed perforated bed and passes through the diffuser by means of a drag conveyer is known as:** | **Mark Allocation** |
| **a.** | 🞎 | Bagasse Diffuser. |  |
| **b.** | 🞎 | B.M.A. Diffuser. |  |
| **c.** | 🞎 | Van Hengel Diffuser. |  |
| **d.** | 🞎 | Burnett Diffuser. |  |
| **e.** | 🞎 | de Smet Diffuser. | 2 |

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| **4.53** | **In a 12-cell fixed bed diffuser, water is added just before the stage 12 and the juice extracted is pumped just ahead of stage 11. This process is repeated and the juice extracted from the first stage, is sent to the factory for processing. This process is known as:** | **Mark Allocation** |
| **a.** | 🞎 | Counter flow diffusion. |  |
| **b.** | 🞎 | Recycling diffusion. |  |
| **c.** | 🞎 | Percolation diffusion. |  |
| **d.** | 🞎 | Bagasse diffusion. |  |
| **e.** | 🞎 | Contra-flow diffusion. | 2 |

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| **4.54** | **What is the reason for the bagasse moving slowly through the diffuser?** | **Mark Allocation** |
| **a.** | 🞎 | The drive can only move slowly due to the high volume of cane. |  |
| **b.** | 🞎 | The de-watering mills need to be fed slowly to maximise extraction. |  |
| **c.** | 🞎 | To allow for percolation of the juice through the bed to maximise extraction. |  |
| **d.** | 🞎 | The prevent gaps in the diffuser bed. |  |
| **e.** | 🞎 | To stop blinding of the diffuser bed. | 2 |

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| **4.55** | **Where does Press Water come from?** | **Mark Allocation** |
| **a.** | 🞎 | From the washing under the diffuser and mills. |  |
| **b.** | 🞎 | From the de-watering mills. |  |
| **c.** | 🞎 | Condensate from the factory. |  |
| **d.** | 🞎 | From the DSM screens. |  |
| **e.** | 🞎 | None of the above. | 2 |

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| **4.56** | **How is it possible to determine if cane preparation has been efficient for diffusion?** | **Mark Allocation** |
| **a.** | 🞎 | A smooth Brix curve will indicate good preparation. |  |
| **b.** | 🞎 | A Brix curve with an increase of Brix indicated where press water is returned will indicate poor preparation. |  |
| **c.** | 🞎 | Flooding in the diffuser can indicate over preparation. |  |
| **d.** | 🞎 | All the above. |  |
| **e.** | 🞎 | None of the above. | 2 |

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| **4.57** | **Percolation in diffusers needs to be controlled to try and ensure that the juice sprayed onto the bed exits in the correct tray. How is correct circulation measured?** | **Mark Allocation** |
| **a.** | 🞎 | By moving the juice sprays away from the direction of the diffuser. |  |
| **b.** | 🞎 | By moving the juice sprays towards the direction of the diffuser. |  |
| **c.** | 🞎 | By observing the percolation through the diffuser windows. |  |
| **d.** | 🞎 | By monitoring the Brix curve. |  |
| **e.** | 🞎 | By conducting tracer tests. | 2 |

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| **4.58** | **Why is juice extracted from a higher stage number (eg stage 8) returned to the cane bed at a lower stage number (eg stage 7)?** | **Mark Allocation** |
| **a.** | 🞎 | To improve percolation. |  |
| **b.** | 🞎 | Because the Brix of juice from stage 8 is lower than the Brix of the cane in stage 7 and diffusion will take place. |  |
| **c.** | 🞎 | Because the Brix of juice from stage 8 is higher than the Brix of the cane in stage 7 and diffusion will take place. |  |
| **d.** | 🞎 | To recycle the juice. |  |
| **e.** | 🞎 | All the above. | 2 |

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| **4.59** | **What will minimise bacterial activity in a diffuser?** | **Mark Allocation** |
| **a.** | 🞎 | Operating temperature of +- 85 oC. |  |
| **b.** | 🞎 | Maintaining a pH of between 6,0 – 6,5. |  |
| **c.** | 🞎 | Introduction of V1 or V2 steam. |  |
| **d.** | 🞎 | All the above. |  |
| **e.** | 🞎 | None of the above. | 2 |
| **4.60** | **At what stage in a 12-cell diffuser should press water be introduced?** | **Mark Allocation** |
| **a.** | 🞎 | Stage 11. |  |
| **b.** | 🞎 | At stage 8, where the Brix of the cane is much higher than the Brix of the press water. |  |
| **c.** | 🞎 | At the stage where the Brix of the press water corresponds closely with the Brix of the cane.  |  |
| **d.** | 🞎 | At stage 1 so that the press water spends as little time in the diffuser as possible. |  |
| **e.** | 🞎 | Press water is added to the scalding juice. | 2 |

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| **4.61** | **Why is it important to maintain a bed height of +- 1,5M?** | **Mark Allocation** |
| **a.** | 🞎 | To maximise the capacity of the diffuser. |  |
| **b.** | 🞎 | To ensure that percolation can be managed. |  |
| **c.** | 🞎 | To ensure that juice cannot be lost out of the discharge end. |  |
| **d.** | 🞎 | For a smooth and efficient operation. |  |
| **e.** | 🞎 | All the above. | 2 |

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| **4.62** | **What is the main difference between cane preparation for milling and cane preparation for diffusion?** | **Mark Allocation** |
| **a.** | 🞎 | Diffusion requires a higher preparation index, but still needs longer fibres to create a mat effect in the diffuser. |  |
| **b.** | 🞎 | Preparation for milling relies on the performance of the shredder. |  |
| **c.** | 🞎 | Diffusion requires a lower preparation index, allowing for better percolation. |  |
| **d.** | 🞎 | There is no difference in the requirements. |  |
| **e.** | 🞎 | All the above. | 2 |

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| **4.63** | **Where is the tons of cane per hour controlled in a diffuser operation?** | **Mark Allocation** |
| **a.** | 🞎 | The dewatering mills. |  |
| **b.** | 🞎 | The main carrier. |  |
| **c.** | 🞎 | The shredder feed drums. |  |
| **d.** | 🞎 | The diffuser drive. |  |
| **e.** | 🞎 | The press water drum. | 2 |
| **4.64** | **Low Brix juices tend to deteriorate quickly, especially as temperatures drop. What would be the best practice in diffuser operation when a long breakdown occurs.** | **Mark Allocation** |
| **a.** | 🞎 | Liquidate the diffuser as quickly as possible. |  |
| **b.** | 🞎 | Dump the low Brix juices onto the diffuser floor for manual lime treatment and later recovery. |  |
| **c.** | 🞎 | Inject high volumes of steam into the diffuser to maintain the temperatures. |  |
| **d.** | 🞎 | Add milk of lime and run all the recirculation pumps. |  |
| **e.** | 🞎 | All the above. | 2 |
| **4.65** | **Why is juice, especially from a milling tandem, screened?** | **Mark Allocation** |
| **a.** | 🞎 | To remove all the sand from the juice before it enters the factory. |  |
| **b.** | 🞎 | To extract more sucrose from the cane. |  |
| **c.** | 🞎 | To provide cleaner bagasse with less sand to the boilers. |  |
| **d.** | 🞎 | To remove excess sand and fibre that has been incorporated in the juice during the extraction process. |  |
| **e.** | 🞎 | All the above. | 2 |

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| **4.66** | **What is the main precaution to take with DSM and/or rotary screens?** | **Mark Allocation** |
| **a.** | 🞎 | Cleanliness and prevention of bacteria growth which will lead to losses. |  |
| **b.** | 🞎 | To ensure that the fibre is returned to the mill. |  |
| **c.** | 🞎 | Checking for wear on the screens to ensure that they are operational. |  |
| **d.** | 🞎 | Addition of lime to maintain the pH. |  |
| **e.** | 🞎 | All the above. | 2 |

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| **4.67** | **Sand is an extraneous matter that comes in with the cane. Where is most of the sand trapped in a diffuser?** | **Mark Allocation** |
| **a.** | 🞎 | The draught juice. |  |
| **b.** | 🞎 | The DSM screens. |  |
| **c.** | 🞎 | The juice trays. |  |
| **d.** | 🞎 | The bagasse. |  |
| **e.** | 🞎 | The cush-cush. | 2 |

**TRUE OR FALSE QUESTIONS:**

**Award one mark for selection of valid “x”. One mark = Competent**

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| **4.68** | **TRUE or FALSE: There are several key factors for efficient diffuser operation. Choose the true and false statements.** | **Mark Allocation** |
| **a.** | 🞎 | Scalding juice, heated to +- 85 oC is added to the diffuser to assist with raising the operating temperature of the diffuser. |  |
| **b.** | 🞎 | Press water is added to the diffuser at the last stage to improve extraction. |  |
| **c.** | 🞎 | Lime is added to the diffuser at certain points to maintain the pH at 4,5 to 5,5. |  |
| **d.** | 🞎 | Lifting screws are installed to break up the cane bed and assist with percolation. |  |
| **e.** | 🞎 | Cane preparation is critical and as many cells as possible must be exposed to maximise extraction during the diffusion process. | 5 |

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| **4.69** | **TRUE or FALSE: There are several factors that influence extraction efficiency. State which statements are true and which are false** | **Mark Allocation** |
| **a.** | 🞎 | A cane Preparation Index over 92 is required for good extraction. |  |
| **b.** | 🞎 | A decrease in the number of stages in a diffuser will increase extraction. |  |
| **c.** | 🞎 | A percolation rate that allows liquid to move horizontally across the diffuser bed will decrease extraction. |  |
| **d.** | 🞎 | Long retention times of juice in the diffuser will improve extraction through reduced bacterial action. |  |
| **e.** | 🞎 | An optimal operating temperature of about 85 oC  | 5 |



Figure 1 above depicts a typical diffuser layout. Use the diagram to answer the following three questions.

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| **4.70** | **TRUE or FALSE: Refer to Figure 1.** | **Mark Allocation** |
| **a.** | 🞎 | The DSM screens are depicted as number 2. |  |
| **b.** | 🞎 | The Scalding Juice Heater is depicted as number 6. |  |
| **c.** | 🞎 | Exhaust steam is injected at number 7. |  |
| **d.** | 🞎 | Press water is introduced at number 15. |  |
| **e.** | 🞎 | The recirculating pumps are represented by number 13. | 5 |

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| **4.71** | **TRUE or FALSE: Refer to Figure 1.** | **Mark Allocation** |
| **a.** | 🞎 | The dewatering mills are depicted by number 17. |  |
| **b.** | 🞎 | Number 14 is known as the bagasse kicker. |  |
| **c.** | 🞎 | The cane bed is depicted by number 9. |  |
| **d.** | 🞎 | The draught juice is represented by number 3. |  |
| **e.** | 🞎 | Milk of lime is introduced at number 5. | 5 |

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| **4.72** | **TRUE or FALSE: Refer to Figure 1.** | **Mark Allocation** |
| **a.** | 🞎 | The lifting screws are shown as number 10. |  |
| **b.** | 🞎 | The shredder is shown as number 4. |  |
| **c.** | 🞎 | Imbibition is introduced at number 12. |  |
| **d.** | 🞎 | Number 8 refers to the juice trays. |  |
| **e.** | 🞎 | Number 14 depicts the press water drum, which also acts as a seal to keep the juice in the diffuser. | 5 |

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| **4.73** | **TRUE or FALSE: There is a difference between the juice quality between milling and diffusion. State which statements are true and which are false.** | **Mark Allocation** |
| **a.** | 🞎 | Colour in diffuser juice is higher than colour in juice from milling. |  |
| **b.** | 🞎 | Colour in diffuser juice is lower than colour in juice from milling. |  |
| **c.** | 🞎 | Diffuser juice has lower turbidity with lower suspended solids than juice from milling. |  |
| **d.** | 🞎 | Diffuser juice has lower turbidity with higher suspended solids than juice from milling. |  |
| **e.** | 🞎 | Diffuser juice has higher turbidity with lower suspended solids than juice from milling. | 5 |

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| **4.74** | **TRUE or FALSE: The purity of juice from the diffusion process is usually slightly lower than the juice purity from the milling process. State which statements are true and which are false.** | **Mark Allocation** |
| **a.** | 🞎 | The milling process cannot extract all the dissolved solids from the bagasse, whereas the diffusion process can. |  |
| **b.** | 🞎 | Due to the heat in diffusion, some starches go into solution and will be read as dissolved solids, increasing the Brix. This does not occur with milling. |  |
| **c.** | 🞎 | Diffusion has a higher extraction and this means a higher non-pol, which will lower the purity. Milling has a lower extraction. |  |
| **d.** | 🞎 | There are more sucrose losses in the diffusion process versus the milling process. |  |
| **e.** | 🞎 | There is a longer residence time in diffusers versus milling, thus causing the juice purity to drop. | 5 |

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| **4.75** | **TRUE or FALSE: Which statements are true and which are false with regards to diffuser maintenance?** | **Mark Allocation** |
| **a.** | 🞎 | pH needs to be maintained at 5,8 to 6,0 to prevent corrosion. |  |
| **b.** | 🞎 | The sprays and spray valves need to be changed annually. |  |
| **c.** | 🞎 | Chain runners wear and need to be replaced every few years. |  |
| **d.** | 🞎 | Pumps need regular maintenance although they run at low speeds. |  |
| **e.** | 🞎 | The perforated plate needs to be changed every 5 to 10 years due to wear. | 5 |

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| **4.76** | **TRUE or FALSE: There are several advantages of diffusion versus milling. State which are true and which are false.** | **Mark Allocation** |
| **a.** | 🞎 | Lower capital cost. |  |
| **b.** | 🞎 | Higher power consumption. |  |
| **c.** | 🞎 | Increase in juice colour. |  |
| **d.** | 🞎 | Easier and cheaper operation. |  |
| **e.** | 🞎 | Uses less steam. | 5 |

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| **4.77** | **TRUE or FALSE: There are several disadvantages of diffusion versus milling. State which are true and which are false.** | **Mark Allocation** |
| **a.** | 🞎 | Lower suspended solids therefore less mud. |  |
| **b.** | 🞎 | Requires more floor space. |  |
| **c.** | 🞎 | Uses more steam. |  |
| **d.** | 🞎 | Higher power consumption. |  |
| **e.** | 🞎 | Increased ash content of bagasse causes more wear and tear on the boilers. | 5 |

1. FINAL MARKS

**TOTAL MARKS: 220**

**PASS MARK: 176**

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| **LEARNER MARKS** |  |
| **PERCENTAGE** |  |
| **ASSESSOR SIGNITURE:** |