**LEARNER SUMMATIVE ASSESSMENT TOOL KNOWLEDGE MODULE 2:**

**KNOWLEDGE COMPONENT: LEARNER SUMMATIVE ASSESSMENT TOOL KNOWLEDGE MODULE 2: THE SUGAR MANUFACTURING PROCESS**

**Occupational Certificate: Sugar Processing Controller**

**LEARNER SUMMATIVE ASSESSMENT TOOL KNOWLEDGE MODULE 2:**

**THE SUGAR MANUFACTURING PROCESS**

**THE SUGAR MANUFACTURING PROCESS**

****

**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 2: The sugar manufacturing process** |
| **Date of Assessment** |  |
| **Portfolio submission Date** |  |
| **Assessor Signature** |  |
| **Total Marks for Knowledge Module 2** | 240 marks |
| **Marks attained** |  |
| **Place:** |  |

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

1. COMPETENCY SUMMARY OF ASSESSMENT

|  |  |  |  |
| --- | --- | --- | --- |
|  | | | |
| **Module 2** | **KM-02-KT01: The sugar manufacturing process** | **C** | **NYC** |
| **1** | 1.1. The process steps of cane to crystal can be identified on a flow diagram and explained |  |  |
|  | 1.2. An understanding of control systems used to control specific production areas can be demonstrated |  |  |
|  | 1.3. An understanding of the relationship between instrument and product flow and quality can be demonstrated |  |  |
| **2** | **KM-02-KT02:** Rework and recycling | * + - * + **C** | **NYC** |
|  | 2.1. The effects of rework and recycling of specific production flows and targets can be explained |  |  |
| **3** | **KM-02-KT03:** Sugar and By-Products Analysis | **C** | **NYC** |
|  | 3.1. An understanding of mechanical and chemical breakdown of sucrose can be demonstrated in terms of factory efficiencies |  |  |
|  | 3.2. Calculations are accurately performed |  |  |

1. ASSESSMENT ALIGNMENT MATRIX (INTERGRATED OUTCOMES)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Module No: 2** | **How it is assessed (Assessment methodology)** | **Where it is 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: The sugar manufacturing process** |  |  |  |
| **NQF level and credits:**  NQF Level 5: 12 Credits |  |  |  |
| **Topic: 1 The sugar manufacturing process** | page 57 | Learning Activity1.1 page 11 |  |  |  |
| page 58-61 | Learning Activity1.2 page 13-14 |
| **Assessment criteria**: 1 The process steps of cane to crystal can be identified on a flow diagram and explained | Page 61-65 | Learning Activity1.3 page 15-17 |  |  |  |
| **Assessment criteria 2**: An understanding of control systems used to control specific production areas can be demonstrated |  |  |  |  |  |  |  |
| **Assessment criteria: 3** An understanding of the relationship between instrument and product flow and quality can be demonstrated |  |  |  |  |  |  |  |
| **Topic 2.** **Rework and recycling** |  | Page 66-70 |  | Learning Activity2.1 page 19-21 |  |  |  |
| **Assessment criteria:**  The effects of rework and recycling of specific production flows and targets can be explained |  |  |  |  |
| **Topic 3. Sugar and By-Products Analysis** |  | Page 71-120 | Question 2.1-2.30 page 21-29- | Learning Activity3.1-3.14 page 23-65 |  |  |  |
| **Assessment Criteria:** An understanding of mechanical and chemical breakdown of sucrose can be demonstrated in terms of factory efficiencies |  | Page 73- | Question 2.32 -2.33 page 30 |  |  |  |  |
| Page 79-85 | Question 2.34-2.35 page 31 |  |  |  |
| Question 2.34-2.37 page 31 |
| Page 88-114 | Question 2.38-2.42 page 32-33 |  |  |  |
| **Assessment Criteria:** Calculations are accurately performed |  | Page130-146- | Question 2.43-2.48 page 34-35 |  |  |  |  |
| Page 146-198 | Question 2.49-2.54 page 36-37 |
| Question 2.55-2.82 page 37-45 |

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 2: THE SUGAR MANUFACTURING PROCESS** | | | | |
| **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 |  |  |  |  |
|  | **Specific outcome** | **Met requirements** | **Did not meet requirements** | **Comments** |
| 5 |  |  |  |  |

1. OVERALL ASSESSMENT DECISION

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

1. EVIDENCE OF FEEDBACK

|  |  |  |
| --- | --- | --- |
| **Module No : 2**  **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 | |
| 3 | Evidence Topic 3 | |  | |  |  | |  | | |  | |  | | |  |
|  | Knowledge Assignment | |  | |  |  | |  | | |  | |  | | |  |
| Practical Assignment | |
| Natural Occurring Evidence | |
| Reflection | |
| 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

**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. : Brix, Pol, Moisture, pH and Ash. | **1** |
| **Alignment – Learning Outcome 1:** **Brix, Pol, Moisture, pH and Ash.**  **Award one mark for selection of valid “x”. One mark = Competent** | | | | |
| **2.1** | **Choose the correct definition for sucrose** | | | **Mark Allocation** |
| **a.** | 🞎 | A monosaccharide. | |  |
| **b.** | 🞎 | Glucose. | |  |
| **c.** | 🞎 | Fructose. | |  |
| **d.** | 🞎 | Disaccharide. | |  |
| **e.** | 🞎 | Simple sugar. | | 2 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **2.2** | **What happens during inversion** | | | **Mark Allocation** | |
| **a.** | 🞎 | Decomposition of glucose and fructose. |  | |
| **b.** | 🞎 | Alkaline degradation. |  | |
| **c.** | 🞎 | Decomposition of sucrose. |  | |
| **d.** | 🞎 | Decomposition of glucose. |  | |
| **e.** | 🞎 | Decomposition of fructose. | 2 | |

|  |  |  |  |
| --- | --- | --- | --- |
| **2.3** | **Brix can be defined as:** | | **Mark Allocation** |
| **a.** | 🞎 | Mass of dissolved substances in every factory stream. |  |
| **b.** | 🞎 | Total purity in every factory stream. |  |
| **c.** | 🞎 | Dry solids. |  |
| **d.** | 🞎 | Refractive index. |  |
| **e.** | 🞎 | Percent dissolved substances in every factory stream. | 2 |

|  |  |  |  |
| --- | --- | --- | --- |
| **2.4** | The percentage of dissolved substances is arrived at by the formula,  % Dissolved substances = Mass of dissolved substance(s) X 100  Mass of solution 1  **What is the Brix of a sugar solution that has a total mass of 35g with 5.25 g of sugar?** | | **Mark Allocation** |
| **a.** | 🞎 | 35 oB |  |
| **b.** | 🞎 | 12 oB |  |
| **c.** | 🞎 | 10 oB |  |
| **d.** | 🞎 | 15 oB |  |
| **e.** | 🞎 | 5.25 oB | 2 |

|  |  |  |  |
| --- | --- | --- | --- |
| **2.5** | **When light moves from air through a solution, the amount that the light deviates is called?** | | **Mark Allocation** |
| **a.** | 🞎 | Optical density. |  |
| **b.** | 🞎 | Refraction. |  |
| **c.** | 🞎 | Brix. |  |
| **d.** | 🞎 | Prism. |  |
| **e.** | 🞎 | Percentage. | 2 |

|  |  |  |  |
| --- | --- | --- | --- |
| **2.6** | **What will cause the light to deviate more when passing from air through a solution?** | | **Mark Allocation** |
| **a.** | 🞎 | A solution with a higher optical density. |  |
| **b.** | 🞎 | A solution with more dissolved solids. |  |
| **c.** | 🞎 | A solution with a higher Brix content. |  |
| **d.** | 🞎 | None of the above. |  |
| **e.** | 🞎 | All the above (except d.). | (2) |

|  |  |  |  |
| --- | --- | --- | --- |
| **2.7** | **A Refractometer is calibrated using:** | | **Mark Allocation** |
| **a.** | 🞎 | Diluted syrup. |  |
| **b.** | 🞎 | Sugar solution. |  |
| **c.** | 🞎 | Mixed juice. |  |
| **d.** | 🞎 | Pure sucrose solution. |  |
| **e.** | 🞎 | Dry solids. | (2) |

|  |  |  |  |
| --- | --- | --- | --- |
| **2.8** | **Which will have the higher Brix? A 10% sugar solution or a 10% salt solution?** | | **Mark Allocation** |
| **a.** | 🞎 | The sugar solution because sugar will bend the light more than salt. |  |
| **b.** | 🞎 | The sugar solution because sugar will bend the light less than salt. |  |
| **c.** | 🞎 | There will be no difference. |  |
| **d.** | 🞎 | The salt solution because salt will bend the light less than sugar. |  |
| **e.** | 🞎 | The salt solution because salt will bend the light more than sugar. | (2) |

|  |  |  |  |
| --- | --- | --- | --- |
| **2.9** | **The correct definition of Pol is:** | | **Mark Allocation** |
| **a.** | 🞎 | Rotation of light. |  |
| **b.** | 🞎 | Apparent sucrose. |  |
| **c.** | 🞎 | Saccharimeter reading. |  |
| **d.** | 🞎 | Percent dissolved solids in a factory stream |  |
| **e.** | 🞎 | Polarised light. | (2) |

|  |  |  |  |
| --- | --- | --- | --- |
| **2.10** | **The principle operation of a polarimeter is the use of;** | | **Mark Allocation** |
| **a.** | 🞎 | Light. |  |
| **b.** | 🞎 | Heat. |  |
| **c.** | 🞎 | Absorption. |  |
| **d.** | 🞎 | Polarised Light. |  |
| **e.** | 🞎 | Infra-red Light. | (2) |

|  |  |  |  |
| --- | --- | --- | --- |
| **2.11** | **In a Saccharimeter with a fixed length of sample tube, constant temperature and a standard light source, choose the correct statement below:** | | **Mark Allocation** |
| **a.** | 🞎 | Rotation of light is proportional to the sucrose % solution. |  |
| **b.** | 🞎 | The sample reading will fluctuate. |  |
| **c.** | 🞎 | Rotation of light is disproportionate to the sucrose % solution. |  |
| **d.** | 🞎 | None of the above. |  |
| **e.** | 🞎 | All the above (except d.). | (2) |

|  |  |  |  |
| --- | --- | --- | --- |
| **2.12** | **How can a reading of 100** o**Z be achieved on a Saccharimeter?** | | **Mark Allocation** |
| **a.** | 🞎 | 100 g sugar in a solution. |  |
| **b.** | 🞎 | 13 g sugar plus 13 g salt made up with distilled water to a total of 100 g. |  |
| **c.** | 🞎 | 26 g sugar made up with distilled water to a total of 100 g. |  |
| **d.** | 🞎 | 26 g sugar made up with distilled water to a total of 100 ml. |  |
| **e.** | 🞎 | 13 g sugar plus 13 g salt made up with distilled water to a total of 100 ml. | (2) |

|  |  |  |  |
| --- | --- | --- | --- |
| **2.13** | The percentage of pol (sucrose) in a solution is arrived at by the formula,  % Pol (sucrose) = Mass of pol (sucrose) X 100  Mass of solution 1  **What is the pol (sucrose) of a sugar solution that has 25 g sugar dissolved in 75 g of distilled water?** | | **Mark Allocation** |
| **a.** | 🞎 | 25 % |  |
| **b.** | 🞎 | 75 % |  |
| **c.** | 🞎 | 20 % |  |
| **d.** | 🞎 | 15 % |  |
| **e.** | 🞎 | 100 % | (2) |

|  |  |  |  |
| --- | --- | --- | --- |
| **2.14** | **Today, readings are captured directly from the equipment into a LIMS system and there is no need to look up information on tables. However, what is the name of the table that was used to look up pol results from a Saccharimeter reading?** | | **Mark Allocation** |
| **a.** | 🞎 | A Brix table with refractometer readings across the top and Saccharimeter readings on the sides. |  |
| **b.** | 🞎 | A Schmidtz’s table with refractometer readings across the top and Saccharimeter readings on the sides. |  |
| **c.** | 🞎 | A Schmidtz’s table with Saccharimeter readings across the top and refractometer readings on the sides. |  |
| **d.** | 🞎 | A Schmidtz’s table with refractometer readings across the top and Saccharimeter readings on the sides. |  |
| **e.** | 🞎 | A Schmidtz’s table with Brix percent across the top and Saccharimeter readings on the sides. | (2) |

|  |  |  |  |
| --- | --- | --- | --- |
| **2.15** | **What is the best definition of sucrose purity?** | | **Mark Allocation** |
| **a.** | 🞎 | The ratio of sucrose % to the total dissolved solids %. |  |
| **b.** | 🞎 | The indication of the amount of sucrose in the solution as a percentage of the whole. |  |
| **c.** | 🞎 | Purity = (sucrose divided by Brix) X 100. |  |
| **d.** | 🞎 | A pure sugar solution will be close to 100 purity. |  |
| **e.** | 🞎 | All the above. | (2) |

|  |  |  |  |
| --- | --- | --- | --- |
| **2.16** | **If the Brix of mixed juice is 15.85% and the sucrose is 12.33 % what would the purity of mixed juice be?** | | **Mark Allocation** |
| **a.** | 🞎 | 75.25 |  |
| **b.** | 🞎 | 77.97 |  |
| **c.** | 🞎 | 76.89 |  |
| **d.** | 🞎 | 77.79 |  |
| **e.** | 🞎 | 77.00 | (2) |

|  |  |  |  |
| --- | --- | --- | --- |
| **2.17** | **Which process will determine the moisture content of a sample?** | | **Mark Allocation** |
| **a.** | 🞎 | Balance |  |
| **b.** | 🞎 | Drying oven. |  |
| **c.** | 🞎 | Evaporation. |  |
| **d.** | 🞎 | Analyst |  |
| **e.** | 🞎 | All the above (except d.). | (2) |

|  |  |  |  |
| --- | --- | --- | --- |
| **2.18** | **What is the correct definition of an ion?** | | **Mark Allocation** |
| **a.** | 🞎 | The smallest particle of an element that can exist. |  |
| **b.** | 🞎 | A compound. |  |
| **c.** | 🞎 | A molecule. |  |
| **d.** | 🞎 | Atoms, molecules and compounds. |  |
| **e.** | 🞎 | An atom that carries an electrical charge. | (2) |

|  |  |  |  |
| --- | --- | --- | --- |
| **2.19** | **If a compound is high in hydroxide ions, what would the possible pH be?** | | **Mark Allocation** |
| **a.** | 🞎 | 7. |  |
| **b.** | 🞎 | 0. |  |
| **c.** | 🞎 | 5. |  |
| **d.** | 🞎 | None of the above. |  |
| **e.** | 🞎 | All the above (except d.). | (2) |

|  |  |  |  |
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| **2.20** | **If a solution is known to be basic, what would the possible pH be?** | | **Mark Allocation** |
| **a.** | 🞎 | 7. |  |
| **b.** | 🞎 | 0. |  |
| **c.** | 🞎 | 5. |  |
| **d.** | 🞎 | None of the above. |  |
| **e.** | 🞎 | All the above (except d.). | (2) |

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| **2.21** | **A pH meter can be standardized in the sugar industry by using;** | | **Mark Allocation** |
| **a.** | 🞎 | Litmus paper at 3 and 11 pH. |  |
| **b.** | 🞎 | Indicator solution at 4 and 10 pH. |  |
| **c.** | 🞎 | Buffer solution at 4 and 10 pH. |  |
| **d.** | 🞎 | Buffer solution at 3 and 9 pH. |  |
| **e.** | 🞎 | Buffer solution at 4 and 12 pH. | (2) |

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| **2.22** | **What is the purpose of measuring pH in the sugar manufacturing process?** | | **Mark Allocation** |
| **a.** | 🞎 | Sucrose will breakdown into glucose and fructose in acidic and basic conditions. |  |
| **b.** | 🞎 | To ensure that there is the correct pH of sugar made. |  |
| **c.** | 🞎 | To help with the evaporation process. |  |
| **d.** | 🞎 | None of the above. |  |
| **e.** | 🞎 | All the above (except d.). | (2) |

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| **2.23** | **When should a pH meter be switched off?** | | **Mark Allocation** |
| **a.** | 🞎 | To get correct readings, it should be switched off once per shift. |  |
| **b.** | 🞎 | It should always be left on, in the standby position if not in use. |  |
| **c.** | 🞎 | When the electrodes get dirty and need cleaning. |  |
| **d.** | 🞎 | When the pH Meter is not in use. |  |
| **e.** | 🞎 | To get correct readings, it should be switched off and on between samples. | (2) |

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| **2.24** | **If a pH electrode contains a solution, what is the precaution taken?** | | **Mark Allocation** |
| **a.** | 🞎 | Ensure that it is always filled with the appropriate solution, usually KCl. |  |
| **b.** | 🞎 | Ensure that it is always filled with the appropriate solution, usually NaCl. |  |
| **c.** | 🞎 | Ensure that it is always filled with the appropriate solution, usually de-ionised water. |  |
| **d.** | 🞎 | Ensure that it is immersed in KCl. |  |
| **e.** | 🞎 | Ensure that it is immersed in de-Ionised water. | (2) |

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| **2.25** | **What is the best definition for Ash in a sugar manufacturing environment?** | | **Mark Allocation** |
| **a.** | 🞎 | The soil that is found under the cane carriers. |  |
| **b.** | 🞎 | The organic compounds of a product. |  |
| **c.** | 🞎 | The sulphuric acid residue after the analysis. |  |
| **d.** | 🞎 | The inorganic salts in factory streams. |  |
| **e.** | 🞎 | The decomposed oxides. | (2) |

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| **2.26** | **When measuring conductivity ash, what causes an increase in the reading?** | | **Mark Allocation** |
| **a.** | 🞎 | Lower resistance of the solution. |  |
| **b.** | 🞎 | Increased concentration of ions. |  |
| **c.** | 🞎 | Higher conductivity of the sample. |  |
| **d.** | 🞎 | None of the above. |  |
| **e.** | 🞎 | All the above (except d.). | (2) |

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| **2.27** | **Why would the conductivity of pure water be zero?** | | **Mark Allocation** |
| **a.** | 🞎 | The ion content is too high for a reading. |  |
| **b.** | 🞎 | The water may contain sucrose molecules. |  |
| **c.** | 🞎 | The resistance in the water is too high for a reading. |  |
| **d.** | 🞎 | Water contains neutrally charged molecules. |  |
| **e.** | 🞎 | All the above. | (2) |

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| **2.28** | **What is the advantage of adding sulphuric acid to the sample for sulphated ash analysis?** | | **Mark Allocation** |
| **a.** | 🞎 | The sulphates are stable and do not readily decompose. |  |
| **b.** | 🞎 | Allows a result to be achieved within one hour. |  |
| **c.** | 🞎 | Reacts with the sugar sample, reducing it to ash. |  |
| **d.** | 🞎 | Improves the repeatability of the analysis. |  |
| **e.** | 🞎 | All the above. | (2) |

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| **2.29** | The ash % is arrived at by the formula, % ash = Mass of ash X 100  Mass of sample  **Given a mass of the crucible plus sugar of 70.4352g and a mass of crucible and ash after ashing of 60.4439g, what is the ash % of the sample? The mass of the empty crucible is 60.4320g.** | | **Mark Allocation** |
| **a.** | 🞎 | 0.0119 %. |  |
| **b.** | 🞎 | 10.0032 %. |  |
| **c.** | 🞎 | 0.011 %. |  |
| **d.** | 🞎 | 0.012 %. |  |
| **e.** | 🞎 | 0.021 %. | (2) |

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| **2.30** | **Why is a thermometer required in the conductivity ash analysis?** | | **Mark Allocation** |
| **a.** | 🞎 | To take the temperature of the water bath. |  |
| **b.** | 🞎 | To apply a correction if the sample is read at 20 oC. |  |
| **c.** | 🞎 | To add +- 2 % per degree if the sample is read above 20 oC. |  |
| **d.** | 🞎 | To subtract +- 2 % per degree if the sample is read above 20 oC. |  |
| **e.** | 🞎 | All the above. | (2) |

**True or False Questions**

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| **2.31** | **TRUE or FALSE: for the following statements.** | | **Mark Allocation** |
| **a.** | 🞎 | Cane enters the shredder then cane knives before entering the diffuser for extraction. |  |
| **b.** | 🞎 | The screened juice leaving the diffuser is called clear juice. |  |
| **c.** | 🞎 | Juice is concentrated by evaporating water, to a thick syrup. |  |
| **d.** | 🞎 | B-sugar is packaged as speciality sugar. |  |
| **e.** | 🞎 | C-molasses is too thick for further boiling’s and is a by-product. | (5) |

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| **2.32** | **TRUE or FALSE: The constituents of sugar cane are:** | | **Mark Allocation** |
| **a.** | 🞎 | Insoluble fibre – 25%. |  |
| **b.** | 🞎 | Water – 70%. |  |
| **c.** | 🞎 | Dissolved substances – 15% |  |
| **d.** | 🞎 | Sucrose - +- 13% |  |
| **e.** | 🞎 | Gums – 5% | (5) |

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| **2.33** | **TRUE or FALSE: The difference between % dissolved solids and % dry solids is:** | | **Mark Allocation** |
| **a.** | 🞎 | Very different for low Brix factory products. |  |
| **b.** | 🞎 | Marginal difference for mixed juice. |  |
| **c.** | 🞎 | Not very different for high Brix factory products. |  |
| **d.** | 🞎 | Big difference for molasses. |  |
| **e.** | 🞎 | Not different at all. | (5) |

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| **2.34** | **TRUE or FALSE: The Brix of factory products is obtained by:** | | **Mark Allocation** |
| **a.** | 🞎 | Mixed juice can be filtered and read directly. |  |
| **b.** | 🞎 | Syrup and Remelt require a dilution of 1:5 before being read. |  |
| **c.** | 🞎 | Massecuites and molasses require a 1:4 dilution before being read. |  |
| **d.** | 🞎 | Syrup and Remelt require a dilution of 1:4 before being read. |  |
| **e.** | 🞎 | Massecuites and molasses require a 1:5 dilution before being read. | (5) |

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| **2.35** | **TRUE or FALSE: The following can impact a Brix reading:** | | **Mark Allocation** |
| **a.** | 🞎 | Temperature. |  |
| **b.** | 🞎 | pH. |  |
| **c.** | 🞎 | Turbidity. |  |
| **d.** | 🞎 | Sample Evaporation. |  |
| **e.** | 🞎 | Sample Dilution. | (5) |

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| **2.36** | **TRUE or FALSE: Sucrose can be measured using:** | | **Mark Allocation** |
| **a.** | 🞎 | Near infrared spectroscopy. |  |
| **b.** | 🞎 | Gas chromatograph. |  |
| **c.** | 🞎 | Saccharimeter. |  |
| **d.** | 🞎 | pH Meter. |  |
| **e.** | 🞎 | Conductivity Meter. | (5) |

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| **2.37** | **TRUE or FALSE: For the following statements:** | | **Mark Allocation** |
| **a.** | 🞎 | Sucrose is much higher than pol in mixed juice. |  |
| **b.** | 🞎 | Pol is higher than sucrose. |  |
| **c.** | 🞎 | Molasses pol is much lower than sucrose. |  |
| **d.** | 🞎 | Mixed juice has a low difference between pol and sucrose. |  |
| **e.** | 🞎 | The difference between pol and sucrose does not vary much for different products. | (5) |

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| **2.38** | **TRUE or FALSE: The angle of rotation in a Saccharimeter is effected by:** | | **Mark Allocation** |
| **a.** | 🞎 | Concentration of the sample. |  |
| **b.** | 🞎 | Monochromatic light. |  |
| **c.** | 🞎 | Length of the sample tube. |  |
| **d.** | 🞎 | Temperature. |  |
| **e.** | 🞎 | Refraction. | (5) |

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| **2.39** | **TRUE or FALSE: Today the use of dry lead sub-acetate is not used to clarify samples for pol readings. What is the reason for this?** | | **Mark Allocation** |
| **a.** | 🞎 | Lead sub-acetate is a hazardous chemical and is difficult to dispose of. |  |
| **b.** | 🞎 | Technology has advanced that allows equipment the ability to analyse darker solutions, |  |
| **c.** | 🞎 | Lead sub-acetate gives inaccurate results versus the modern equipment. |  |
| **d.** | 🞎 | Lead sub-acetate is not manufactured any more. |  |
| **e.** | 🞎 | NIR can give accurate sucrose results without clarifying the sample at all. | (5) |

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| **2.40** | **TRUE or FALSE: Which factory products listed below contain moisture?** | | **Mark Allocation** |
| **a.** | 🞎 | Final molasses. |  |
| **b.** | 🞎 | Sugar cane. |  |
| **c.** | 🞎 | Sugar. |  |
| **d.** | 🞎 | Mixed juice. |  |
| **e.** | 🞎 | Remelt. | (5) |

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| **2.41** | **TRUE or FALSE: pH can be measured in the following ways:** | | **Mark Allocation** |
| **a.** | 🞎 | Conductivity meter. |  |
| **b.** | 🞎 | Indicator solution. |  |
| **c.** | 🞎 | Titrations. |  |
| **d.** | 🞎 | Indicator paper |  |
| **e.** | 🞎 | pH meter. | (5) |

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| **2.42** | **TRUE or FALSE: The primary methods for determining the ash % of a factory stream:** | | **Mark Allocation** |
| **a.** | 🞎 | Sulphated ash. |  |
| **b.** | 🞎 | Spectrophotometer ash. |  |
| **c.** | 🞎 | pH ash. |  |
| **d.** | 🞎 | Conductivity ash. |  |
| **e.** | 🞎 | Incineration ash. | (5) |

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| **Scope of Assessment** | | | **Exit Level Outcome/s** | | **Module/s** | |
|  | | | 1. :Phosphate, colour, starch, grain size, reducing sugars, sugar traces | | **1** | |
| **Alignment – Learning Outcome 2:** **Phosphate, colour, starch, grain size, reducing sugars, sugar traces**  **Award one mark for selection of valid “x”. One mark = Competent** | | | | | | |
| **2.43** | **Which factory process is affected by phosphate content?** | | | **Mark Allocation** | |
| **a.** | 🞎 | Clarification. | |  | |
| **b.** | 🞎 | Pan boiling. | |  | |
| **c.** | 🞎 | Juice heating. | |  | |
| **d.** | 🞎 | Evaporation. | |  | |
| **e.** | 🞎 | Curing. | | (2) | |

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| **2.44** | **What is the critical level of phosphate content?** | | **Mark Allocation** |
| **a.** | 🞎 | 150 ppm. |  |
| **b.** | 🞎 | 220 ppm. |  |
| **c.** | 🞎 | 200 ppm |  |
| **d.** | 🞎 | 100 ppm |  |
| **e.** | 🞎 | 300 ppm | (2) |

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| **2.45** | **What is added to increase the phosphate content to the desired level?** | | **Mark Allocation** |
| **a.** | 🞎 | Hydrogen peroxide. |  |
| **b.** | 🞎 | Potassium dihydrogen. |  |
| **c.** | 🞎 | Sulphuric acid. |  |
| **d.** | 🞎 | Super phosphates. |  |
| **e.** | 🞎 | Phosphoric acid. | (2) |

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| **2.46** | **There are three solutions used to generate a standard phosphate graph. Which is the correct combination?** | | **Mark Allocation** |
| **a.** | 🞎 | Phosphate solution, Sodium sulphite solution, Reducing solution. |  |
| **b.** | 🞎 | Phosphate solution, Ammonium molybdate solution, Reducing solution. |  |
| **c.** | 🞎 | Phosphate solution, Ammonium molybdate tetrahydrate, Reducing solution. |  |
| **d.** | 🞎 | Potassium dihydrogen solution, Sodium metabisulphite solution, Reducing solution. |  |
| **e.** | 🞎 | Phososulphonic solution, Ammonium molybdate solution, Reducing solution. | (2) |

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| **2.47** | **The Spectrophotometer is the instrument used to measure phosphate content. At what light wavelength is the measurement done?** | | **Mark Allocation** |
| **a.** | 🞎 | 320 nm. |  |
| **b.** | 🞎 | 600 nm. |  |
| **c.** | 🞎 | 480 nm. |  |
| **d.** | 🞎 | 420 nm. |  |
| **e.** | 🞎 | 700 nm. | (2) |

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| **2.48** | **The spectrophotometer will give a reading of a sample called optical density. What process does the spec use to arrive at this reading?** | | **Mark Allocation** |
| **a.** | 🞎 | Refraction. |  |
| **b.** | 🞎 | Absorbance. |  |
| **c.** | 🞎 | Reflection. |  |
| **d.** | 🞎 | Absolution. |  |
| **e.** | 🞎 | Conductance. | (2) |

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| **2.49** | **How many pure colours are there when a beam of light is sent through a glass prism?** | | **Mark Allocation** |
| **a.** | 🞎 | 5. |  |
| **b.** | 🞎 | 8. |  |
| **c.** | 🞎 | 3. |  |
| **d.** | 🞎 | 7. |  |
| **e.** | 🞎 | 6. | (2) |

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| **2.50** | **Which is the correct statement relating to phosphate determination?** | | **Mark Allocation** |
| **a.** | 🞎 | The false phosphate reading is obtained from the blank. |  |
| **b.** | 🞎 | The addition of ammonium molybdate and reducing solutions develops a blue colour in the sample. |  |
| **c.** | 🞎 | The sample must be read in the spectrophotometer exactly10 minutes after the addition of the reducing solution. |  |
| **d.** | 🞎 | None of the above. |  |
| **e.** | 🞎 | All the above (except d.) | (2) |

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| **2.51** | **Which is the closest colour in the colour spectrum that can measure the colour of raw sugar?** | | **Mark Allocation** |
| **a.** | 🞎 | Yellow. |  |
| **b.** | 🞎 | Green. |  |
| **c.** | 🞎 | Red. |  |
| **d.** | 🞎 | Blue. |  |
| **e.** | 🞎 | Brown. | (2) |

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| **2.52** | **Which product streams are colour and turbidity measured?** | | **Mark Allocation** |
| **a.** | 🞎 | Mixed juice and sugar. |  |
| **b.** | 🞎 | Clarified juice and sugar. |  |
| **c.** | 🞎 | Mixed juice and clarified juice. |  |
| **d.** | 🞎 | C-Molasses and sugar. |  |
| **e.** | 🞎 | Clarified juice and A-molasses. | (2) |

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| **2.53** | **Why is it important for colour to be measured at the correct pH?** | | **Mark Allocation** |
| **a.** | 🞎 | Acidity will cause the sample to get darker. |  |
| **b.** | 🞎 | An alkaline solution will cause the colour to get lighter. |  |
| **c.** | 🞎 | At a neutral pH there will be no development of colour. |  |
| **d.** | 🞎 | None of the above. |  |
| **e.** | 🞎 | All the above (except d.). | (2) |

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| **2.54** | **What Brix percent must raw sugar be for a colour analysis?** | | **Mark Allocation** |
| **a.** | 🞎 | 10 oBx. |  |
| **b.** | 🞎 | 5 oBx. |  |
| **c.** | 🞎 | 13.25 oBx. |  |
| **d.** | 🞎 | 50 oBx. |  |
| **e.** | 🞎 | 80 oBx. | (2) |

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| **2.55** | **Starch is an impurity comprising of glucose molecules strung together. Where does this impurity come from?** | | **Mark Allocation** |
| **a.** | 🞎 | Developed in the extraction process. |  |
| **b.** | 🞎 | Developed during clarification. |  |
| **c.** | 🞎 | Developed in the sugar cane. |  |
| **d.** | 🞎 | Developed during evaporation. |  |
| **e.** | 🞎 | Developed during pan boiling. | (2) |

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| **2.56** | **What is the impact of high starch content of raw sugar?** | | **Mark Allocation** |
| **a.** | 🞎 | Causes severe filtration problems in carbonation refineries. |  |
| **b.** | 🞎 | Causes severe filtration problems in sulphation refineries. |  |
| **c.** | 🞎 | Causes severe filtration problems in the refinery clarification process. |  |
| **d.** | 🞎 | Causes severe filtration problems in the raw house. |  |
| **e.** | 🞎 | Causes severe problems with the storage of sugar. | (2) |

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| **2.57** | **How is starch precipitated for analysis?** | | **Mark Allocation** |
| **a.** | 🞎 | Using hot water. |  |
| **b.** | 🞎 | Under a vacuum. |  |
| **c.** | 🞎 | Acetic acid. |  |
| **d.** | 🞎 | Alcohol. |  |
| **e.** | 🞎 | Calcium chloride. | (2) |

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| **2.58** | **In preparing a starch graph, which is the unstable reagent that must be prepared immediately prior to use?** | | **Mark Allocation** |
| **a.** | 🞎 | Potassium Iodate. |  |
| **b.** | 🞎 | Potassium Iodide. |  |
| **c.** | 🞎 | Calcium chloride. |  |
| **d.** | 🞎 | Acetic acid. |  |
| **e.** | 🞎 | All the above. | (2) |

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| **2.59** | **The Spectrophotometer is the instrument used to measure starch content. At what light wavelength is the measurement done?** | | **Mark Allocation** |
| **a.** | 🞎 | 320 nm. |  |
| **b.** | 🞎 | 600 nm. |  |
| **c.** | 🞎 | 480 nm. |  |
| **d.** | 🞎 | 420 nm. |  |
| **e.** | 🞎 | 700 nm. | (2) |

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| **2.60** | **When conducting a starch determination in raw sugar, how many grams of raw sugar are required for the analysis?** | | **Mark Allocation** |
| **a.** | 🞎 | 30 g. |  |
| **b.** | 🞎 | 25 g. |  |
| **c.** | 🞎 | 20 g. |  |
| **d.** | 🞎 | 100 g. |  |
| **e.** | 🞎 | 50 g | (2) |

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| **2.61** | **Raw sugar grain size is important because:** | | **Mark Allocation** |
| **a.** | 🞎 | A crystal size that is consistent has better storage qualities. |  |
| **b.** | 🞎 | Smaller grains can get trapped by bigger grains, trapping moisture. |  |
| **c.** | 🞎 | A low scatter from the mean is preferable. |  |
| **d.** | 🞎 | None of the above. |  |
| **e.** | 🞎 | All the above (except d.) | (2) |

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| **2.62** | **If raw sugar is not washed prior to grain size analysis, what will happen?** | | **Mark Allocation** |
| **a.** | 🞎 | The sample not be representative. |  |
| **b.** | 🞎 | The raw sugar will stick to the screens. |  |
| **c.** | 🞎 | Smaller grains fill the gaps and get stuck. |  |
| **d.** | 🞎 | None of the above. |  |
| **e.** | 🞎 | All the above (except d.). | (2) |

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| **2.63** | **In the grain size analysis. What reagents are the raw sugar washed with?** | | **Mark Allocation** |
| **a.** | 🞎 | Add methanol and shake hard to dissolve the sugar. |  |
| **b.** | 🞎 | Add distilled water and shake gently, not dissolving the sugar. |  |
| **c.** | 🞎 | Add methanol and distilled water and slosh the solution around to lift the molasses off the crystal. |  |
| **d.** | 🞎 | Add methanol and slosh the solution around to lift the molasses off the crystal. Use ether in the final washing. |  |
| **e.** | 🞎 | None of the above. | (2) |

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| **2.64** | **What sugar molecules make up what is referred to as Reducing Sugars?** | | **Mark Allocation** |
| **a.** | 🞎 | Sucrose, glucose and fructose. |  |
| **b.** | 🞎 | Sucrose and fructose. |  |
| **c.** | 🞎 | Glucose and Fructose. |  |
| **d.** | 🞎 | Sucrose and glucose |  |
| **e.** | 🞎 | Sucrose. | (2) |

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| **2.65** | **What is the feature of reducing sugars?** | | **Mark Allocation** |
| **a.** | 🞎 | They can add electrons to other substances under certain conditions. |  |
| **b.** | 🞎 | They are characterised by reducing cupric salt. |  |
| **c.** | 🞎 | They help maintain an alkaline environment. |  |
| **d.** | 🞎 | None of the above. |  |
| **e.** | 🞎 | All the above (except d.). | (2) |

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| **2.66** | **What laboratory process is used for the determination of reducing sugars?** | | **Mark Allocation** |
| **a.** | 🞎 | Mass difference. |  |
| **b.** | 🞎 | Fehling’s A & B. |  |
| **c.** | 🞎 | Lane and Eynon. |  |
| **d.** | 🞎 | Titration. |  |
| **e.** | 🞎 | Trace test. | (2) |

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| **2.67** | **Why should factory waters be tested for sugar content?** | | **Mark Allocation** |
| **a.** | 🞎 | To indicate if there are any problems with heating vessels. |  |
| **b.** | 🞎 | To make sure that no sugar is being lost. |  |
| **c.** | 🞎 | To ensure that the cooling towers operate efficiently. |  |
| **d.** | 🞎 | To prevent sugar getting into the boiler feed water. |  |
| **e.** | 🞎 | All the above. | (2) |

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| **2.68** | **Which test will determine the actual amount of sugar present in water?** | | **Mark Allocation** |
| **a.** | 🞎 | The quantitative Alpha-naphthol test. |  |
| **b.** | 🞎 | The quantitative phenol-sulphuric acid method. |  |
| **c.** | 🞎 | The qualitative Alpha-naphthol test. |  |
| **d.** | 🞎 | The qualitative resorcinol method. |  |
| **e.** | 🞎 | All the above. | (2) |

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| **2.69** | **The expression of concentration is given in:** | | **Mark Allocation** |
| **a.** | 🞎 | Ph. |  |
| **b.** | 🞎 | G/l |  |
| **c.** | 🞎 | Mg. |  |
| **d.** | 🞎 | Ppm. |  |
| **e.** | 🞎 | Ml/l. | (2) |

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| **2.70** | **What reagents are used when making a standard sugar trace graph for the resorcinol method?** | | **Mark Allocation** |
| **a.** | 🞎 | Refined sugar, distilled water and 0,01% benzoic acid. |  |
| **b.** | 🞎 | Raw sugar, distilled water and 0,01% benzoic acid. |  |
| **c.** | 🞎 | Refined sugar, distilled water and 0,01% ethyl alcohol. |  |
| **d.** | 🞎 | Refined sugar and 0,01% benzoic acid. |  |
| **e.** | 🞎 | Refined sugar and 0,01% ethyl alcohol. | (2) |

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| **2.71** | **When conducting a trace test of factory waters, what is the wavelength that the optical density muse be read for the phenol – sulphuric method?** | | **Mark Allocation** |
| **a.** | 🞎 | 320 nm. |  |
| **b.** | 🞎 | 600 nm. |  |
| **c.** | 🞎 | 480 nm |  |
| **d.** | 🞎 | 420 nm. |  |
| **e.** | 🞎 | 700 nm. | (2) |

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| **2.72** | **How is sugar found in factory waters recovered?** | | **Mark Allocation** |
| **a.** | 🞎 | By re-introducing the water into the mixed juice. |  |
| **b.** | 🞎 | By using the water in the boilers. |  |
| **c.** | 🞎 | By using the water to produce Remelt. |  |
| **d.** | 🞎 | By using the water to wash out the pans. |  |
| **e.** | 🞎 | None of the above. | (2) |

**TRUE OR FALSE QUESTIONS:**

**(One mark for each correct answer.)**

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| **2.73** | **TRUE or FALSE: The primary colours are made up as follows:** | | **Mark Allocation** |
| **a.** | 🞎 | Red, orange, yellow. |  |
| **b.** | 🞎 | Green, blue and violet. |  |
| **c.** | 🞎 | Red, green and blue. |  |
| **d.** | 🞎 | Orange, yellow and green. |  |
| **e.** | 🞎 | Red, blue and yellow. | (5) |

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| **2.74** | **TRUE or FALSE: Answer the following relating to colour and turbidity determination:** | | **Mark Allocation** |
| **a.** | 🞎 | The spectrophotometer measures colour. |  |
| **b.** | 🞎 | Filtrations are done under vacuum. |  |
| **c.** | 🞎 | Turbidity is the difference between the absorbency index of the filtered sample less the ICUMSA - SA colour. |  |
| **d.** | 🞎 | The wavelength for colour measurement is 420 nm |  |
| **e.** | 🞎 | Measurement of total dissolved solids is not important. | (5) |

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| **2.75** | **TRUE or FALSE: What could a high turbidity of clear juice indicate?** | | **Mark Allocation** |
| **a.** | 🞎 | A problem with the clarification process. |  |
| **b.** | 🞎 | That the mixed juice has a low purity. |  |
| **c.** | 🞎 | Potential losses in the juice heaters. |  |
| **d.** | 🞎 | Too much imbibition on the extraction line. |  |
| **e.** | 🞎 | Problems with the evaporator station. | (5) |

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| **2.76** | **TRUE or FALSE: How are the starch levels controlled in sugar production?** | | **Mark Allocation** |
| **a.** | 🞎 | Starch levels are not controlled. |  |
| **b.** | 🞎 | An enzyme called amylose is added to the syrup. |  |
| **c.** | 🞎 | An enzyme called amylopectin is added to the syrup. |  |
| **d.** | 🞎 | An enzyme called amylase is added to the syrup. |  |
| **e.** | 🞎 | A product called amylose is added to the clear juice. | (5) |

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| **2.77** | **TRUE or FALSE: Which filtration methods are used for starch analysis?** | | **Mark Allocation** |
| **a.** | 🞎 | Filter under vacuum, washing the cake with distilled water. |  |
| **b.** | 🞎 | Filter under gravity, using a filter aid. |  |
| **c.** | 🞎 | Filter under vacuum, washing the cake with alcohol. |  |
| **d.** | 🞎 | No filtration. |  |
| **e.** | 🞎 | Filter under gravity and retain the cake for analysis. | (5) |

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| **2.78** | **TRUE or FALSE: Answer the following statements in relation to grain size analysis:** | | **Mark Allocation** |
| **a.** | 🞎 | Co-efficient of variation gives an indication of the distribution scatter. |  |
| **b.** | 🞎 | Fines percent is important for refined sugar. |  |
| **c.** | 🞎 | Specific grain size (S.G.S.) is an important indicator for raw sugar. |  |
| **d.** | 🞎 | MA is an abbreviation for Most Apertures. |  |
| **e.** | 🞎 | Most of the sugar will be caught in the first pan of the mechanical shaker. | (5) |

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| **2.79** | **TRUE or FALSE: Answer the following in connection with determining reducing sugars in juice.** | | **Mark Allocation** |
| **a.** | 🞎 | Filter the sample using filter paper, discarding the first runnings. |  |
| **b.** | 🞎 | Pipette 5ml A and 5ml B Fehling’s solution into a flat bottomed narrow neck boiling flask. |  |
| **c.** | 🞎 | Add 20ml diluted juice from the burette into the flask. |  |
| **d.** | 🞎 | After 10 – 15 minutes of boiling the flask, add diluted juice, 5ml at a time until the original colour of the reagents returns. |  |
| **e.** | 🞎 | Add 3 – 4 drops of methylene blue for the next colour change process. | (5) |

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| **2.80** | **TRUE or FALSE: Answer the following relating to the Alpha – naphthol sugar trace test.** | | **Mark Allocation** |
| **a.** | 🞎 | Use 2ml of a clear sample in a test tube. |  |
| **b.** | 🞎 | Add 5 drops of alpha – naphthol at 20% and mix. |  |
| **c.** | 🞎 | Run 5ml of concentrated sulphuric acid gently down the test tube. Once done mix well. |  |
| **d.** | 🞎 | A violet colour will develop within 30 seconds if sugar is present. |  |
| **e.** | 🞎 | A violet colour will develop within 50 seconds if sugar is present. | (5) |

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| **2.81** | **TRUE or FALSE: When conducting sugar trace analysis, what laboratory instrument is used to obtain the optical density?** | | **Mark Allocation** |
| **a.** | 🞎 | Refractometer. |  |
| **b.** | 🞎 | Spectrophotometer. |  |
| **c.** | 🞎 | Saccharimeter. |  |
| **d.** | 🞎 | Ph meter. |  |
| **e.** | 🞎 | Conductivity meter. | (5) |

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| **2.82** | **TRUE or FALSE: Answer the following in connection with the phenol – sulphuric test for sugar trace in water:** | | **Mark Allocation** |
| **a.** | 🞎 | Only accurate as an indicator of the presence of sugar. |  |
| **b.** | 🞎 | Is accurate from 0 – 200 ppm. |  |
| **c.** | 🞎 | Is only accurate above 80 ppm. |  |
| **d.** | 🞎 | Is accurate up to a maximum if 80 ppm. |  |
| **e.** | 🞎 | Is accurate from 0 – 200 ppm, but only for condensate. | (5) |

1. FINAL MARKS

**TOTAL MARKS: 230**

**PASS MARK: 184**

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