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| **Assignment Brief 2022-2023** |

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| **Student name** |  | | |
| **Qualification** | BTEC Level 3 National Foundation Diploma in Applied Science | **Course code** | RB001B12P1 |
| **Unit number & title** | **Unit 4: Laboratory Techniques and their Application** | | |
| **Assignment title** | Making a nail varnish remover and headache tablet | **Assignment number** | 2 of 3 |
| **Assessor name** | **Rebecca Gaitskell** | **Date issued** | 20/03/2023 |
| **Hand in date and time** | 26/05/2023 by 11:59pm now 12.6.23 | **Hand in location** | Online via Turn it in |
| **Referral submission date & time** | 23/06/2023 by 11:59pm now 30.6.23 | **Hand in location** | Online via Turn it in |

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| **Vocational Scenario** | You are a lab technician working in the research and development department of a cosmetics company. Two of the company’s main products are nail polish remover (contains ethyl ethanoate) and aspirin. Your task is to investigate how to produce and test the purity of ethyl ethanoate and aspirin so that the company can make them efficiently.  You will produce a sample of aspirin and test its purity. You will have to compare your laboratory technique with the industrial process used by the pharmaceutical company to manufacture aspirin on a large scale.  You will produce a sample of ethyl ethanoate and test its purity. You will have to compare your laboratory technique with the industrial process used by the cosmetics company to manufacture ethyl ethanoate on a large scale. |

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| **CRITERIA COVERED BY THIS ASSIGNMENT** | |
| **Criteria** | **To achieve the criteria you must show that you are able to:** |
| P3 | Correctly prepare and test the purity of an organic liquid and draw conclusions. |
| P4 | Describe the industrial manufacture and testing of an organic liquid. |
| P5 | Correctly prepare and test the purity of an organic solid and draw conclusions. |
| P6 | Describe the industrial manufacture and testing of an organic solid. |
| M2 | Demonstrate skilful application of techniques in preparing and testing the purity of an organic liquid and draw detailed conclusions. |
| M3 | Compare the laboratory and industrial manufacture and testing of an organic liquid. |
| M4 | Demonstrate skilful application of techniques in preparing and testing the purity of an organic solid and draw detailed conclusions. |
| M5 | Compare the laboratory and industrial manufacture and testing of an organic solid. |
| D2 | Analyse the factors affecting the yield and purity of an organic liquid in the laboratory and their relevance to its industrial manufacture. |
| D3 | Analyse the factors affecting the yield and purity of an organic solid in the laboratory and their relevance to its industrial manufacture. |

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| **Links to English and maths (GCSE \ Functional Skills)** |

Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts. Researching from multiple sources.

Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively

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| **Created by** | | **Internally Verified by** | | **Lead Internal Verifier** | |
| Rebecca Gaitskell | | Minuka Weerasinghe | |  | |
| **Date:** | 18/07/2022 | **Date:** | 20/07/2022 | **Date:** |  |

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| **STUDENT DECLARATION** | | | |
| **Student name:** |  | **Assessment set by:** |  |
| I understand that plagiarism, which includes copying from the internet, other students' work or any other source whether referenced or not, will lead to disciplinary action (see FE Regulations). I confirm that the work I am submitting is wholly my own. I also understand that I am responsible for keeping my assignments safe and secure for three years following certification of my qualification and these may be recalled at any time within this period.  ***Student signature: Date:*** | | | |

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| **TASKS** | | **Student tick when complete** |
|  | **Task 1.** Prepare a sample of aspirin and test its purity, demonstrating skilful application of the techniques you use (i.e. vacuum filtration, filtration through filter paper, solvent extraction and recrystallization, and testing the purity by measuring the melting point and using thin layer chromatography). You will measure the melting point of aspirin prepared from reaction and extraction and carry out a mixed-melting point measurement on the two samples, using a pure sample as a comparison. **(C.P5)**  Write a report detailing your production and testing aspirin in the laboratory. The report must:   * Explain the scientific principles behind your practical work techniques * Give detailed conclusions about how pure the aspirin is, based on the tests that you carried out **(C.M4)** * Identify factors that affect the yield and purity of aspirin in your laboratory preparation and analyse how significant these factors are * Research and describe the industrial manufacture and testing of aspirin **(B.P6)** * Compare the laboratory and industrial manufacture and testing of aspirin, explaining principles, similarities and differences in the equipment, techniques, testing, raw materials and the scale of production **(C.M5)** * Analyse how relevant the factors you have identified as affecting yield and purity are in the industrial manufacture of aspirin and in ensuring scalability **(C.D3)** * Analyse whether melting point measurement, mixed melting point measurement and thin layer chromatography are effective ways to assess whether an organic solid is pure and explaining whether other methods used industrially are more effective **(C.D3)**     **Task 2**. Prepare a sample of ethyl ethanoate and test its purity, demonstrating skilful application of the techniques you use (ie reflux and distillation using QuickfitTM apparatus, addition of chemicals to purify the ethyl ethanoate and testing its purity by measuring its boiling point and infrared spectrum and comparing with reference information). **(B.P3)**  Write a report detailing your production and testing of ethyl ethanoate in the laboratory. The report must:     * Explain the scientific principles behind your practical work techniques * Give detailed conclusions from your practical work **(B.M2)** * Identify factors that affect the yield and purity of ethyl ethanoate in your laboratory preparation and analyse how significant these factors are * Research and describe the industrial manufacture and testing of ethyl ethanoate, including raw materials, equipment and scale of production **(B.P4)** * Compare the laboratory and industrial manufacture and testing of ethyl ethanoate, explaining principles, similarities and differences in the equipment and techniques used **(B.M3)** * Analyse how relevant the factors you have identified as affecting yield and purity are in the industrial manufacture of ethyl ethanoate **(B.D2)** * Analyse whether boiling point measurement and infrared spectroscopy are effective ways to assess purity of a liquid, and draw a conclusion on whether other methods used industrially, such as chromatography are more reliable. **(B.d2)** |  |

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| **Evidence required to be submitted for this assignment:** | A report on the practical work and the detailed conclusions from making ethyl ethanoate and aspirin, including the analysis of factors affecting yield and purity, and research on industrial manufacture and testing.  An observation report by the teacher of making and testing the liquid and the solid safely.  All information sources should be referenced. |

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| **Sources of information to support you with this assignment:** |  |

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| **ASSESSOR FEEDBACK & DECLARATION** | | | | |
| **Targeted criteria** | **Criteria achieved?**  (Yes / No) | **Assessor comments** | | |
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| P6 |  |  | | |
| M2 |  |  | | |
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| D2 |  |  | | |
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| **General assessor comments** | | | | |
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| **Assessor declaration** | | I certify that the evidence submitted for this assignment is the learner’s own. The learner has clearly referenced any sources used in the work. I understand that false declaration is a form of malpractice. | | |
| **Assessor signature** | |  | **Date** |  |
| **IV signature (if applicable)** | |  | **Date** |  |
| **Lead IV signature (if applicable)** | |  | **Date** |  |
| **Student comments** | | | | |
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| **Student signature** | |  | **Date** |  |

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| **RESUBMISSION FEEDBACK & DECLARATION (if applicable)** | | | | |
| **Targeted criteria** | **Criteria achieved?**  (Yes / No) | **Assessor comments** | | |
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| P4 |  |  | | |
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| P6 |  |  | | |
| M2 |  |  | | |
| M3 |  |  | | |
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| D2 |  |  | | |
| D3 |  |  | | |
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| **Assessor declaration** | | I certify that the evidence submitted for this assignment is the learner’s own. The learner has clearly referenced any sources used in the work. I understand that false declaration is a form of malpractice. | | |
| **Assessor resubmission comments (if applicable)** | | | | |
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| **Assessor signature** | |  | **Date** |  |
| **IV signature (if applicable)** | |  | **Date** |  |
| **Lead IV signature (if applicable)** | |  | **Date** |  |
| **Student comments** | | | | |
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