CAPE Unit 1 Physics Mark Scheme

|  |  |  |  |
| --- | --- | --- | --- |
| Labs | Title | Skills Assessed | Graded Practical |
|  |  |  |  |
| 1 | Measurement and Uncertainty | AI | x |
| 2 | Linear motion | ORR | x |
| 3 | P&D - Terminal Velocity | P&D | x |
| 4 | Archimedes Principle | AI | x |
| 5 | Properties of a wave on a string | ORR |  |
| 6 | Plane Reflection | MM | x |
| 7 | Plane Reflection | MM | - |
| 8 | Oscillating Spring Mass | AI |  |
| 9 | Sound | P&D | x |
| 10 | Lung capacity | MM | x |
| 11 | Force and deformation | P&D | - |
| 12 | Young modulus | ORR | x |
| 13 | Specific heat capacity of aluminium | P&D | - |
| 14 | Implementation | AI | x |

Lab 1: measurement and uncertainty (SKILLS)

|  |  |  |
| --- | --- | --- |
|  | Details | Marks |
| Measurements  And calculation | Measurement diameter with Vernier | 1 |
| Measured diameter for 5 coins | 1 |
| Calculate diameter and uncertainty from the five coin for one coin | 1  1 |
| Which of the diameter measurement is best | 1 |
| Calculate the magnitude of the density  Uncertainty | 2  3 |
| Discussion | Explain how to obtain measurement for thickness and mass | 1  1 |
|  |  | 12 |

Lab 2: Linear motion

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Details | Marks |
| Method |  | Clear and in proper sequence | 1 |
|  |  | Writes in past tense | 1 |
|  |  | Includes all key steps | 1 |
| Results |  | Suitable title | 1 |
|  |  | Correct SI units for all quantities measured | 1 |
|  |  | Suitable range of readings | 1 |
| Graph |  | Title of graph | 1 |
|  |  | Plots graph correctly (s vs t2) | 1 |
|  |  | Labels axes | 1 |
|  |  | Line of best fit | 1 |
|  |  | Graph size covers more than half the page both ways | 1 |
| Conclusion |  | Includes a statement with the results reached | 1 |
|  | TOTAL | | 12 |

Lab 3: Terminal Velocity – P&D

|  |  |  |
| --- | --- | --- |
|  | Details | Marks |
|  |  |
| (a) Hypothesis | 1 |
| (b) Aim | 1 |
| (c) Apparatus | 1 |
| (d) Method | 2 |
| (e) Manipulating, Responding and Controlled Variable | 3 |
| (f) Precautions/Assumptions/Possible Sources of Error (2 each) | 2 |
| (g) Expected Results | 2 |
|  |  |
| TOTAL | 12 |

Lab 4: Archimedes Prinicples

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Details | Marks |
| Calculations |  | Correct moments equation | 1 |
|  |  | Determines mass of the rubber stopper | 2 |
|  |  | Determines upthrust on rubber stopper | 1 |
|  |  | Weight of water displaced for the stopper | 2 |
| Discussion |  | Relate the results to Archimedes' Principle of buoyancy | 2 |
|  |  | Answer questions 1 and 2 | 2 |
|  |  | States at least one error and precaution | 1 |
|  |  | Conclusion related to the aim | 1 |
|  | TOTAL | | 12 |

Lab 5 Properties of a wave

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Details | Marks |
| Method |  | Clear and in proper sequence | 1 |
|  |  | Writes in past tense | 1 |
|  |  |  |  |
| Results |  | Suitable title | 1 |
|  |  | Proper SI units and headings | 1 |
|  |  | Suitable range of readings | 1 |
| Graph |  | Title of graph | 1 |
|  |  | Plots graph correctly | 1 |
|  |  | Label axes (x and y) | 2 |
|  |  | Line of best fit | 1 |
|  |  | Graph size covers more than half the page both ways | 1 |
| Conclusion |  | Includes a statement with the results reached | 1 |
|  | TOTAL | | 12 |

Lab 6: PLANE REFLECTION - MM

|  |  |
| --- | --- |
| Details | Marks |
| A. Uses pencil with sharp point | 1 |
| B. Ensure lens edges are on the positioning lines | 1 |
| C. Draws normal at 90˚ to mirror line | 2 |
| D. Measures angles of incidence and reflection from the normal | 2 |
| E. One Pinhole close to lens, the other close to the edge of paper | 2 |
| F. Pins straight and vertical | 1 |
| G. Pins properly aligned | 2 |
| H. Indicating pinholes by circling them | 1 |
| Total | 12 |
| Lab 7: PLANE REFRACTION - MM | |
| Details | Marks |
| A. Uses pencil with sharp point | 1 |
| B. Correctly setup of apparatus (glass block, protractor, and light source) | 1 |
| C. Draws normal at 90˚ to the boundary at the first boundary and secondary boundary | 2 |
| D. Accurate measurement of at least three different incident angles | 2 |
| E. Accurate measurement of at least three different refracted angles | 2 |
| F. Clear labelling of the incident ray and refracted ray | 2 |
| G. Arrows are used to identify incident and refracted rays | 2 |
|  |  |
| Total | 12 |

Lab 8: Oscillation of a spring - mass

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Details | Marks |
| Calculations |  | Determine k of 2 springs in series | 1 |
|  |  | Determine k of 2 springs in parallel | 1 |
|  |  | Proof of the ratios of k in series to  k in parallel is equal to 2 | 2 |
| Discussion |  | Graphical Analysis in relation to Spring Constant, k | 3 |
|  |  | Answers all questions | 3 |
|  |  | States at least one error and precaution | 2 |
|  | TOTAL | | 12 |

Lab 9: Sound

|  |  |  |
| --- | --- | --- |
|  | Details | Marks |
|  |  |
| (a) Hypothesis | 1 |
| (b) Aim | 1 |
| (c) Apparatus | 1 |
| (d) Method | 2 |
| (e) Manipulating, Responding and Controlled Variable | 3 |
| (f) Precautions/Assumptions/Possible Sources of Error (2 each) | 2 |
| (g) Expected Results | 2 |
|  |  |
| TOTAL | 12 |

Lab 10: Lung capacity

|  |  |  |
| --- | --- | --- |
| Criteria | Details | Marks |
| Proper technique | Correct use of Vernier Calliper | 2 |
|  | Demonstration of correct breathing technique | 2 |
| Consistency | Perform Multiple trials | 2 |
| Recording | Records all measurements with appropriate units | 2 |
|  | Determine the uncertainty measurement | 2 |
| Calculation | Sample calculation of average lung capacity from multiple trials | 2 |

Lab 11: Forces and Deformation – P&D

|  |  |  |
| --- | --- | --- |
|  | Details | Marks |
|  |  |
| (a) Hypothesis | 1 |
| (b) Aim | 1 |
| (c) Apparatus | 1 |
| (d) Method | 2 |
| (e) Manipulating, Responding and Controlled Variable | 3 |
| (f) Precautions/Assumptions/Possible Sources of Error (2 each) | 2 |
| (g) Expected Results | 2 |
|  |  |
| TOTAL | 12 |

Lab 12: Young’s Modulus - AI

|  |  |  |
| --- | --- | --- |
|  | Details | Marks |
| Calculation | Find Gradient and n | 1 |
|  | Find Y-intercept and k | 2 |
|  | Calculate Young’s Modulus | 2 |
|  |  |  |
| Discussion | Relationship Between period of oscillation and length of blade | 2 |
| Describe Graph | 1 |
| At least One source of error and Precaution | 2 |
| Conclusion | Includes a statement with the results reached | 2 |
|  | Total | 12 |

Lab 13: Specific heat capacity of aluminum

|  |  |  |
| --- | --- | --- |
|  | Details | Marks |
|  |  |
| (a) Hypothesis | 1 |
| (b) Aim | 1 |
| (c) Apparatus | 1 |
| (d) Method | 2 |
| (e)  Manipulating  Responding  Controlled Variable | 1  1  1 |
| (f)  Two Precautions and  Two Assumptions or  Two Possible Sources of Error or  Two Limitations | 1  1 |
| (g) Expected Results | 2 |
|  |  |
| TOTAL | 12 |

Lab 14: Implementation – The Investigative Report

 