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| **Part I** | |
| Starting height (m) |  |
| Stopping height (m) |  |

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| --- | --- |
| Average force (N) |  |
| Work done by the average force (N•m=J) |  |
| Integral (during lift) of force *vs.* distance graph (J) |  |
| % comparison between Work by Faverage and Integral |  |
| Change in potential energy, *U=mg*y (J) |  |
| % difference between Work and *U* |  |

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| **Part II** | |
| Spring Constant (N/m) |  |

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| --- | --- | --- | --- |
|  | Stretch | | |
|  | 0->10 cm | 0->20 cm | 0->Maximum |
| Integral (during pull) (N•m=J) |  |  |  |
| Change in potential energy, *U=ks2/2*  (J) |  |  |  |
| % difference between Work and *U* |  |  |  |

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| **Part III** | |
| Mass of cart and sensor (kg) |  |

|  |  |
| --- | --- |
| Final velocity (m/s) |  |
| Integral during push (N•m=J) |  |
| Change in kinetic energy, *K=mv2/2* (J) |  |
| % difference between net Work and *K* |  |

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| **Part IV** | |
| Mass of cart (kg) |  |
| Acceleration (m/s2) |  |
| a/g =Sin  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Point | Position on ramp (m) | Velocity (m/s) | Vertical height (m) | Potential Energy (J) | Kinetic Energy (J) | Total Mechanical Energy (J) | % Difference between points | |
| 1 |  |  |  |  |  |  | 1-2 |  |
| 2 |  |  |  |  |  |  | 2-3 |  |
| 3 |  |  |  |  |  |  | 3-4 |  |
| 4 |  |  |  |  |  |  | 4-1 |  |