

## AME 20216 – Lab Report Score Sheet

A5 and A6 – Solar Energy

NDID#: \_\_\_\_\_

Lab Section (Day/time): \_\_\_\_\_

### General Requirements (10 points)

| Item and Description                                                                                                                                                                         | Points Awarded | Possible Points |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------|
| <b>Overall quality of writing</b><br>(spelling, grammar, readability, captions, and discussion)                                                                                              |                | 5               |
| <b>Format and Technical Elements</b> (font, margins, page numbers, heading, abstract/summary, findings, conclusion, numbered equations, variables, figures, tables, captions and references) |                | 5               |
| <b>TOTAL</b>                                                                                                                                                                                 |                | 10              |

**Technical Writing** – Write a full lab report with a Summary, Findings, and Conclusions section. (See the example on the [Resources](#) page of the course website.)

- **Summary** section should have a few sentences explaining the work and its significance, then present the most important values (numbers) that were measured or calculated.
- **Results** section should briefly explain the experiments and calculations, then discuss the results. Be sure to address relevant talking points from the lab handout.
- **Conclusions** section should reiterate the important take-aways, address any unanswered talking points from the lab handouts, and discuss possible future directions.
- Do *not* write a first-person narrative. Rather, write it as a declaration of objective observations, scientific facts, and logical deductions.

**References** – The report must include 2 references. These can be data sheets from the lab website, articles from the internet, the textbook, etc. References should follow the [ASME format](#).

## Deliverables for A5 and A6 (25 points)

For more details on any of the items below, please refer to the lab handout.

| Item and Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Points Awarded | Possible Points |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------|
| <b>A5: A plot of measured output voltage vs. load resistance for the two different lamp irradiances</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                | 3               |
| <b>A5: Plot of measured efficiency vs. load resistance for the two different lamp irradiances with vertical lines denoting the internal resistances</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                | 3               |
| <b>A5: Plot of measured irradiance vs. distance for the two different lamp irradiances</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                | 3               |
| <b>A5: Plot of log(irradiance) vs. log(distance) for the two different lamp irradiances with linear curve fits and slopes in the caption</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                | 3               |
| <b>A6: Table summarizing your design parameters and calculations</b> <ul style="list-style-type: none"> <li>• The approximate area of the vehicle roof in <math>\text{m}^2</math>.</li> <li>• The number of solar panels that will fit on the roof</li> <li>• The total area of the solar panels in <math>\text{m}^2</math></li> <li>• The percent efficiency of the solar panels</li> <li>• The irradiance in <math>\text{kWhrs/day/m}^2</math> at the location</li> <li>• The total average power in <math>\text{kWhrs/day}</math> the solar panels are expected to produce</li> <li>• The energy storage capacity of the battery</li> <li>• The number of batteries needed to store half a day's worth of energy from the panels.</li> </ul> |                | 5               |
| <b>A6: Table summarizing the power requirements for each of the devices</b> <ul style="list-style-type: none"> <li>• Typical voltage required</li> <li>• Typical current required</li> <li>• Instantaneous power consumption in kW</li> <li>• Estimated daily usage of each device in hrs/day</li> <li>• Estimated avg. power consumption for each device in <math>\text{kWhrs/day}</math></li> <li>• "Feasible" or "Not Feasible" for each device</li> </ul>                                                                                                                                                                                                                                                                                   |                | 5               |
| <b>A6: Bill of materials (BOM) for the solar panels, batteries, and charge controller</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                | 3               |
| <b>TOTAL</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                | 25              |

OVERALL SCORE \_\_\_\_\_ / 35

## Format

- Use a 12 point “serifed” font such as Times New Roman.
- Document should be double-spaced.
- Document should have 1” margins in all directions.
- Page numbers are required centered at bottom of page.
- Equations must be numbered.
- All variables must be italicized.
- All variables in an equations must be defined (i.e. “where  $c$  is the speed of sound”).
- Captions should be the same font as the rest of the document.
- Do *not* use the \* symbol to denote multiplication.

## Guidelines for Deliverables

- Tables should always be centered with captions *above* labeled Table 1, etc..
- Tables should have black text on white background with 12 point Times New Roman.
- Tables should have the text centered both horizontally and vertically.
- Plots should *not* have titles.
- Plots should always have axes clearly labeled with units.
- Plots should always be centered with captions *beneath* labeled Fig. 1, etc.
- Theoretical curves should always be smooth and continuous (no “kinks”).
- Measured data points should be plotted as individual markers. If there are *more than 20* measured data points, then connect them or use a continuous line.