

# PHTN1300 Lab Marking Scheme

## Lab #1: Introduction to Spectroscopy (2008F)

Name: \_\_\_\_\_

Tube S/N: P00\_\_\_\_\_

Tube Gas: \_\_\_\_\_

\_\_\_\_ / 26 Total

- \_\_\_ /-1 Cover Page
- \_\_\_ /2 **Abstract**
  - \_\_\_ Summary of experiment (why)
  - \_\_\_ Summary of methods used (manual spectroscope, gas discharges)
  - \_\_\_ Summary of **results**
- \_\_\_ /3 **Background (Intro)**
  - \_\_\_ How a spectroscope works with Relevant formulae included (grating)
  - \_\_\_ Explanation of expected blackbody spectrum
  - \_\_\_ Expected gas spectrum and principles of emission
    - \_\_\_ Major emission lines cited
  - \_\_\_ Diagrams as appropriate
- \_\_\_ /4 **Procedure**
  - \_\_\_ Enough detail to reproduce the experiment precisely
  - \_\_\_ Diagrams as required to describe the setup
  - \_\_\_ Experiment phases: observation of grating orders
  - \_\_\_ All relevant physical parameters described (e.g. d of grating, duty cycle of tubes 30/30)
  - \_\_\_ No cut-and-paste
- \_\_\_ /12 **Observations**
  - \_\_\_ Calibration procedure – manual spectroscope
    - \_\_\_ True zero
    - \_\_\_ Estimate of measurement error
  - \_\_\_ Observed output of the incandescent lamp
    - \_\_\_ Observation of orders
  - [3] \_\_\_ Fluorescent lamp observations
    - \_\_\_ optical output observations with wavelengths identified
    - \_\_\_ Identify lines from Hg, Phosphor, buffer gas
    - \_\_\_ Reason for assignment of source
    - \_\_\_ Buffer gas identified with explanation
  - [3] \_\_\_ Gas discharge tube observations
    - \_\_\_ Lines identified for each spectrum tube used
    - \_\_\_ Comparison to known lines (Hg, Neon, H)
    - \_\_\_ Percentage error with 'known' lines determined
  - [3] \_\_\_ Unknown gas analysis
    - \_\_\_ OO Spectrometer calibrated with Hg lines, stated and explained
    - \_\_\_ Offset error determined
    - \_\_\_ Gas identified by comparison to known gas emission lines
    - \_\_\_ Analysis explained
- \_\_\_ /5 **Conclusion**
  - \_\_\_ Incandescent output described and related to Boltzmann distribution
  - [2] \_\_\_ Fluorescent lamp output described
    - \_\_\_ identify bands from Hg, Phosphor, buffer gas
    - \_\_\_ buffer gas identified
  - [2] \_\_\_ Unknown gas identified and METHODOLOGY explained
    - \_\_\_ # lines compared, justification provided
    - \_\_\_ tolerance of uncertainty cited and explained
- \_\_\_ /-2 **References**
  - \_\_\_ All used cited
  - \_\_\_ Quality references used