

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Department of Chemistry

5.311 Grade Sheet

Fall 2005

Place this cover sheet on the **WRITTEN** lab report for Experiment # 1 before submitting the report in the Undergraduate Labs, between 1:00 P.M. and 1:10 P.M. on the date due.

Report Date: _____

TA grade _____

Student name: _____

TA name: _____

Group: A, B (please circle)

Section: MW / TR (please circle)

Experiment #1: Kinetics

You have SEVEN (7) Calendar Days from the TA grading date to request any review of the grading of your report. Also, after seven days from TA grading date, no report will be accepted for change of an incorrectly added score, or any requested re-evaluation. It is **your responsibility** to take the time to promptly look over each report when it is returned to you. After 14 CALENDAR DAYS beyond the report due date, no late or make-up report will be accepted. Absence from the lab due to illness is the only excused lateness for reports.

Quiz (15)..... _____

Pre-lab preparation (10)..... _____

It is essential that you have reviewed and recorded information in your notebook. Be concise; **do not copy lab book!**

The factual record (15)..... _____

Data, procedure signed and dated. It is important to develop good record keeping habits.

The Staff's assessment of technique, deportment, safety (5)..... _____

Waste Inventory Sheet (5)..... _____

The Written Report: results, presentation, and discussion (50)..... _____

A. (10) Absorption spectrum; proper labeling of axes, identification of optimum wavelength and molar absorptivity; error analysis; experimental details (reagents used and purity (if known) composition and dimensions of the cuvette; model and brand of UV-vis spectrometer used).

B. (10) Kinetic runs: Balanced equations. Role of all reagents. Reaction mechanism. graphs *A versus t*; choice of observation wavelength, including concerns of contributions from species other than the $K_3[Fe(CN)_6]$.

C. (15) Determination of rate constants (k_{obs} , k_o , k_{real} , units); Debye-Hückel correlation (Z_1Z_2); discussion of the results; comparison of the results to expected ones.

D. (5) Analysis and discussion of class results, Arrhenius plot, determination of E_a and A .

E. (10) Effectiveness and clarity of presentation and visual aids

Total (100)..... _____

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Department of Chemistry

5.311 Grade Sheet

Fall 2005

Place this cover sheet on the **WRITTEN** lab report for Experiment # 2 before submitting the report in the Undergraduate Labs, between 1:00 P.M. and 1:10 P.M. on the date due.

Report Date: _____

TA grade _____

Student name: _____

TA name: _____

Group: A, B (please circle)

Section: MW / TR (please circle)

Experiment #2: Nuclear Magnetic Resonance

You have SEVEN (7) Calendar Days from the TA grading date to request any review of the grading of your report. Also, after seven days from TA grading date, no report will be accepted for change of an incorrectly added score, or any requested re-evaluation. It is **your responsibility** to take the time to promptly look over each report when it is returned to you. After 14 CALENDAR DAYS beyond the report due date, no late or make-up report will be accepted. Absence from the lab due to illness is the only excused lateness for reports.

Quiz (15)..... _____

Pre-lab preparation (10)..... _____

It is essential that you have reviewed and recorded information in your notebook. Be concise; **do not copy lab book!**

The factual record (15) _____

Data, procedure signed and dated. It is important to develop good habits in keeping a notebook.

The Staff's assessment of technique, deportment, safety (5)..... _____

Waste Inventory Sheet (5) _____

The Written Report: results, presentation, and discussion (50) _____

- A. (10) Known compounds: include description of experimental procedure and spectrum simulation.
- B. (10) Unknown #1: for each unknown, include chemical shift/multiplicity/integration, simulation of the spectrum, rationale for identification, and identification.
- C. (10) Unknown #2
- D. (10) Unknown #3
- E. (10) Effectiveness and clarity of presentation and visual aids.

Total (100)..... _____

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Department of Chemistry

5.311 Grade Sheet

Fall 2005

Bring this Grade Sheet with you to your scheduled Oral Report on **Experiment # 3**.

Report Date: _____

TA grade _____

Student name: _____

TA name: _____

Group: A, B (please circle)

Section: MW / TR (please circle)

Experiment #3: Unknown Aromatic Carboxylic Acid

You have SEVEN (7) Calendar Days from the TA grading date to request any review of the grading of your report. Also, after seven days from TA grading date, no report will be accepted for change of an incorrectly added score, or any requested re-evaluation. It is **your responsibility** to take the time to promptly look over each report when it is returned to you. After 14 CALENDAR DAYS beyond the report due date, no late or make-up report will be accepted. Absence from the lab due to illness is the only excused lateness for reports.

Quiz (15)....._____

Pre-lab preparation (10)....._____

It is essential that you have reviewed and recorded information in your notebook. Be concise; **do not copy lab book!**

The factual record (15)....._____

Data, procedure signed and dated. It is important to develop good habits in keeping a notebook.

The Staff's assessment of technique, deportment, safety (5)....._____

Waste Inventory Sheet (5)....._____

The Written/Oral Report: results, proper format, and discussion (50)....._____

- A. (10). Isolation of acid: includes material balance, yields, recrystallization results, purity of acid, calibration plot and accuracy of melting point.
- B. (8) Standardization of base: includes the titration table, calculations, error analysis and propagation of errors, precision.
- C. (10) Titration of acid: determination of conditions of sample dissolution, titration table, calculations, error analysis, propagation of errors, precision.
- D. (7) pK_a values; includes data tables, titration curve(s)
- E. (5) 1H -NMR comments.
- F. (10) Proper format of the report, includes discussion and data presentation

Total (100)....._____

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Department of Chemistry

5.311 Grade Sheet

Fall 2005

Bring this Grade Sheet with you to your scheduled Oral Report on **Experiment # 4**.

Report Date: _____

TA grade _____

Student name: _____

TA name: _____

Group: A, B (please circle)

Section: MW / TR (please circle)

Experiment #4: Ferrocene & Acetylferrocenes

You have SEVEN (7) Calendar Days from the TA grading date to request any review of the grading of your report. Also, after seven days from TA grading date, no report will be accepted for change of an incorrectly added score, or any requested re-evaluation. It is **your responsibility** to take the time to promptly look over each report when it is returned to you. After 14 CALENDAR DAYS beyond the report due date, no late or make-up report will be accepted. Absence from the lab due to illness is the only excused lateness for reports.

Quiz (15)..... _____

Pre-lab preparation (10)..... _____

It is essential that you have reviewed and recorded information in your notebook. Be concise; **do not copy lab book!**

The factual record (15)..... _____

Data, procedure signed and dated. It is important to develop good habits in keeping a notebook.

The Staff's assessment of technique, deportment, safety (5)..... _____

Waste Inventory Sheet (5)..... _____

The Written/Oral Report: results, presentation, and discussion (50)..... _____

- A. (10) Preparation of ferrocene: include descriptions of all procedures, data collected, and results, calculations of yields, purification procedure, purity of ferrocene, m.p., discussion of results.
- B. (10) Acetylation of ferrocene: includes description of all procedures and data collections; GC – MS assessment of ferrocene and of monoacetyl and diacetyl ferrocene in the crude reaction mixture, descriptions of all results, presentation of data, weights, pH, etc., crude yield, discussion of results.
- C. (5) TLC: includes description of all procedures and data collection, description of all results, discussion of conditions and solvent polarities, the appearance and tracing of plates.
- D. (7) Column Chromatography: includes justification of solvent system choices, description of all procedures, data collection and all results, column preparation, appearance, description of separation, table of labeled fractions, volume of eluate, purity of product, discussion of results.
- E. (3) Variation of Lewis acidity and product distribution: Analysis and discussion of class results.
- F. (5) SPARTAN analysis and discussion of electronic structure and molecular orbitals of ferrocene.
- G. (10) Effectiveness and clarity of presentation and visual aids

Total (100)..... _____