Mid Semester Examination, February 18, 2019

Course CH4207

18/2/19

Time: 90 min

Total Mark: 50 (10 x 5)

Answer the following questions:

Q1.

a. (2 points) Your Instructor AC discussed the important issues on how to write scientific papers using a quotation "Too many scientific papers fall silently in the woods....". Write in 1-2 lines (max) the take home message (THM) he wanted to convey to you by using the quotation.

b. (2 points). Describe in 1-2 lines (max) why the literary devices, metaphors and the like are not recommended for writing scientific papers.

c. (2 points). What is the full form of "IMRAD"?

d. (4 points). Write clearly using just one line short sentences what are the questions which are answered in each of the sections "I", "M", "R" and "D" in a scientific paper.

Q2.

Answer the following questions based on the issues that were discussed at length in the class on the arts of writing scientific papers:

a. (4 points). What is a good strategy to begin the "Discussion" section of a scientific manuscript? Describe in 4-5 lines (max)

and

b. (6 points). What are the aspects you address next in the "Discussion" section of a scientific manuscript? Describe in 6-7 lines (max).

Q3.

a. (3 points). "FFP" is the worst form of scientific misconduct. What is the full form of FFP?

We discussed in our class on various strategies ("DOs" and "DON'Ts" for delivering a good short talk (15 min) in scientific conferences. Based on these discussion,

b. (4 points) List 4 "DOs"

And

c. (3 points) List 3 "DON'Ts".

Q4.

Read the following statements carefully and then answer if true (T) or false (F). For each correct answer one point will be given but for wrong answer two (2) points will be deducted. This is to discourage you from guessing.

a) Ludwig Wittgenstein said "I think therefore I am".

b) A tautology's truth is certain, a proposition's possible, a contradiction's impossible.

c) Lightning is a sudden flow of electrons between electrically charged regions of a cloud, between two clouds, or between a cloud and the ground. This proposition is based on deductive logic.

d) The gravitational acceleration for a feather and a stone are different and that is why in free fall a feather falls slowly compared to a stone.

e) Newton's law of gravitation assumes that action at a distance is possible. This is a postulate.

f) Any property can be considered material if one defines matter in such a way that it has that property.

g) The concept of inertia first proposed by Galileo was an axiom. It was then incorporated in Newton's laws of motion and is now an empirical truth.

h) Rubidium atoms are fermions. That is why when cooled to a very low temperature they form a "super atom" as predicted by Einstein.

i) Phlogiston theory satisfies the falsification criterion of a scientific theory. Lavoisier's experimental results were consistent with law of conservation of mass.

j) Objective thinking leads to an opinion but not truth.

Q5.

Draw diagrams to show:

a) The relationships between truth, knowledge, belief and poorly justified beliefs. 2

b) Change in Free Energy of a thermodynamically unfavorable reaction when it is catalyzed and when it is not catalyzed. 2

c) The molecular level microstructures of different types of polyethylene and polypropylene with their names. 6