**RADICALS FALL 2016 FINAL (75pts x 2 ⇒ 150pts) Name**

1) (10pts) Define (or explain) the following scientific terms within the context of this lecture course:

FREE RADICAL

INITIATOR

INHIBITOR

CHAIN PROCESS

HOMOLYTIC CLEAVAGE

PHOTOCHEMISTRY

ELECTRON IONIZATION

ELECTRON EXCITATION

CARBON CENTERED RADICAL

TERMINATION STEP

2) (3pts) Draw a reasonable Lewis structure (or line angle diagram) for the following species:

SECONDARY ALKYL RADICAL

RADICAL CATION

PERSISTENT (LONG LIVED) RADICAL

3) (2pts) What is the historical scientific significance that many of the reactions we have studied this semester have generated products that can be described as “dimers” (resulting from dimerization)?

**I-III) Attempt 2 of the following 3 questions.**

**(2 x 15 = 30)**

**Note that partial credit will be awarded for:**

 **i) correct labeling of atoms in the starting materials and products**

 **ii) correct initiation steps (where applicable)**

 **iii) correct progress within a plausible mechanism**

 **iv) answering any questions.**

I) Draw a plausible mechanism for this chain process (be sure to include the initiation and propagation steps).



II) Draw a plausible mechanism for the following chain process that is initiated by the thermal homolytic cleavage of the O-Cl bond in the organic hypochlorite.

Also make sure that you explain the stereochemical outcome.



III) Write a plausible mechanism (INITIATION and PROPAGATION steps) for the following *chain* reaction.



Also propose a mechanistic explanation for the generation of this side product from this reaction.



**A-C) Answer 2 of the following 3 questions.**

**(2 x 15 = 30)**

**Note that the following reactions involve *photochemical excitation*, but are very different processes!**



Provide a mechanism for this process.



Explain this observation.



Provide a mechanism to account for the first two products, and then a further mechanism which converts the second product into the third.

**\*\*BONUS QUESTION for up to 2 points\*\***

Think back over this semester, and describe an occasion when a student asked a question, (or raised a topic), and then include my answer or explanation.