1. (10 pts.) Synthesis Literacy – Provide structures for the following named compounds:

(i) Wieland Miescher Ketone
(ii) squalene oxide
(iii) Hagemann's ester
(iv) Hajos Parrish Ketone
(v) a podocarpate part structure
(vi) longifolene
(vii) a hydrochrysene
(viii) ethyl acetoacetate
(ix) methylbromocrotonate

2. (18 pts.) Draw your own substructures and provide electronic arrows to illustrate your command of the following expressions:

(i) Decarboxylation of a vinylogous β-ketoacid
(ii) A Stetter Reaction
(iii) An anion induced oxy Cope Rearrangement
(iv) A [2,3] sigmatropic rearrangement of an allylic sulfoxide to an allylic alcohol
(v) An Eschenmoser fragmentation
(vi) A Stobbe condensation

3. (24 pts.) Propose routes to the following building block type structures from reasonable starting materials.
4. (30 pts.) Provide reasonable mechanisms for the following transformations:

(i) What is the structure of the adduct?
(ii) How is it formed?
(iii) How does it go to B?

(ii) Explain how the carboxy group forms from the methoxide reaction

(iii)

(iv)

(v)

(vi)
5. (20 pts.) Explain the logic used to arrange for the stereochemistry of the following structures:

(a) an intermediate

(b)

(c)

(d)

6. (18 pts.) (a) Propose a plausible biosynthetic route from squalene oxide to lupeol:

Explain how A was transformed to B. Show only critical steps:
7. (30 pts.) Analyze the following structures as possibly arising from intramolecular alkylations or reactions on simpler precursors. On this basis, propose a synthesis of each compound. You need not specify every step in detail. Emphasize your retrosynthetic plan.

(a) 

(b) 

(c)