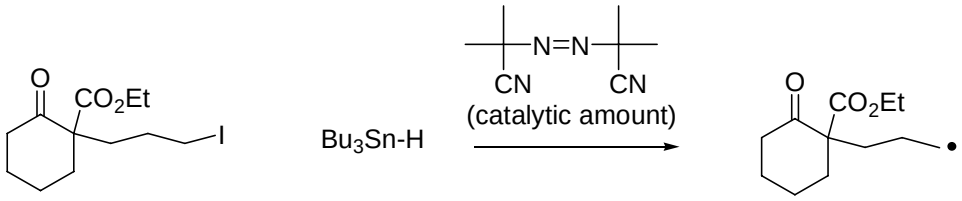
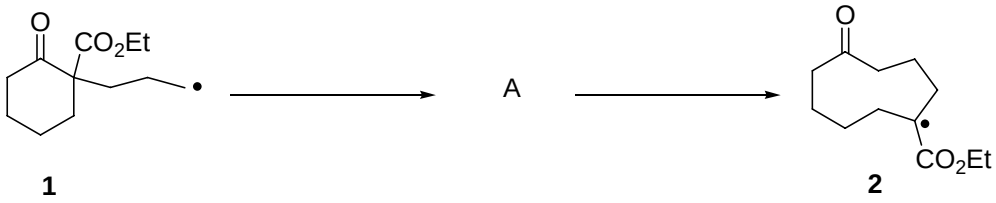
Spring 2009 TWQ 2 (25points) **Name**_____

1-5) List the 5 types of reactions that radicals can perform.

6-9) Write the mechanism for the interaction of this free radical initiator, tributyl tin hydride and alkyl iodide, which results in the formation of the corresponding alkyl radical.



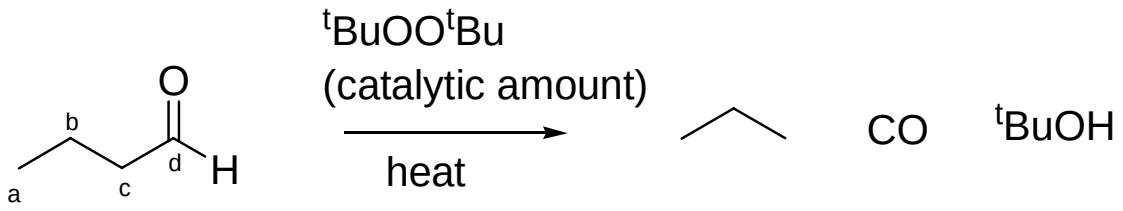
10-17) Radical **1** then undergoes an *exo cyclization* with the <u>ketone</u> group. That intermediate (labelled as A) then undergoes ring opening to produce the radical **2**. Write the mechanism for these steps, which must include the structure of A.



1 **2**

18) Give one reason why you think radical A undergoes ring opening.

19-20) For the below free radical chain reaction, indicate in the products where carbon atoms a, b, c and d end up.



21-25) Write the mechanism for the above free radical chain process.

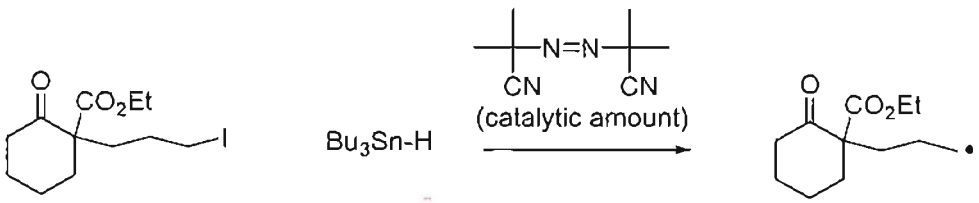
Bonus Points: for the above mechanism, indicate the *initiation* step(s), and the *propagation* steps for this chain process.

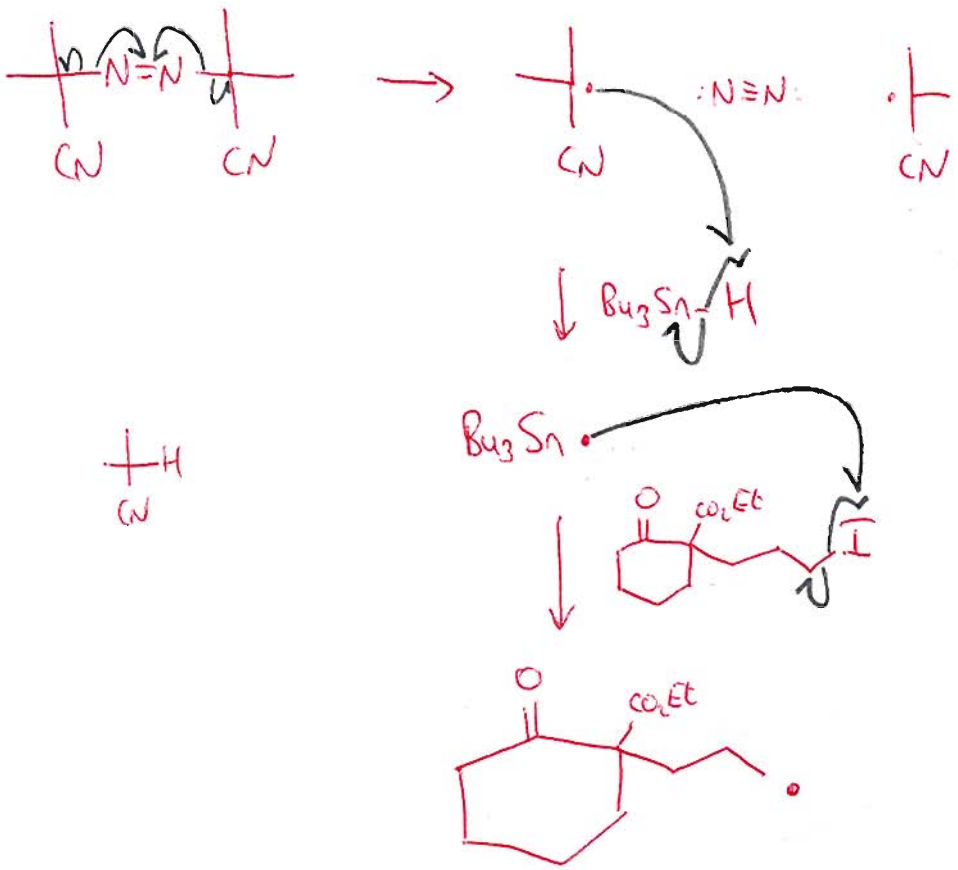
Spring 2009TWQ 2 (25points) **Name** TWQ 2

1-5) List the 5 types of reactions that radicals can perform.

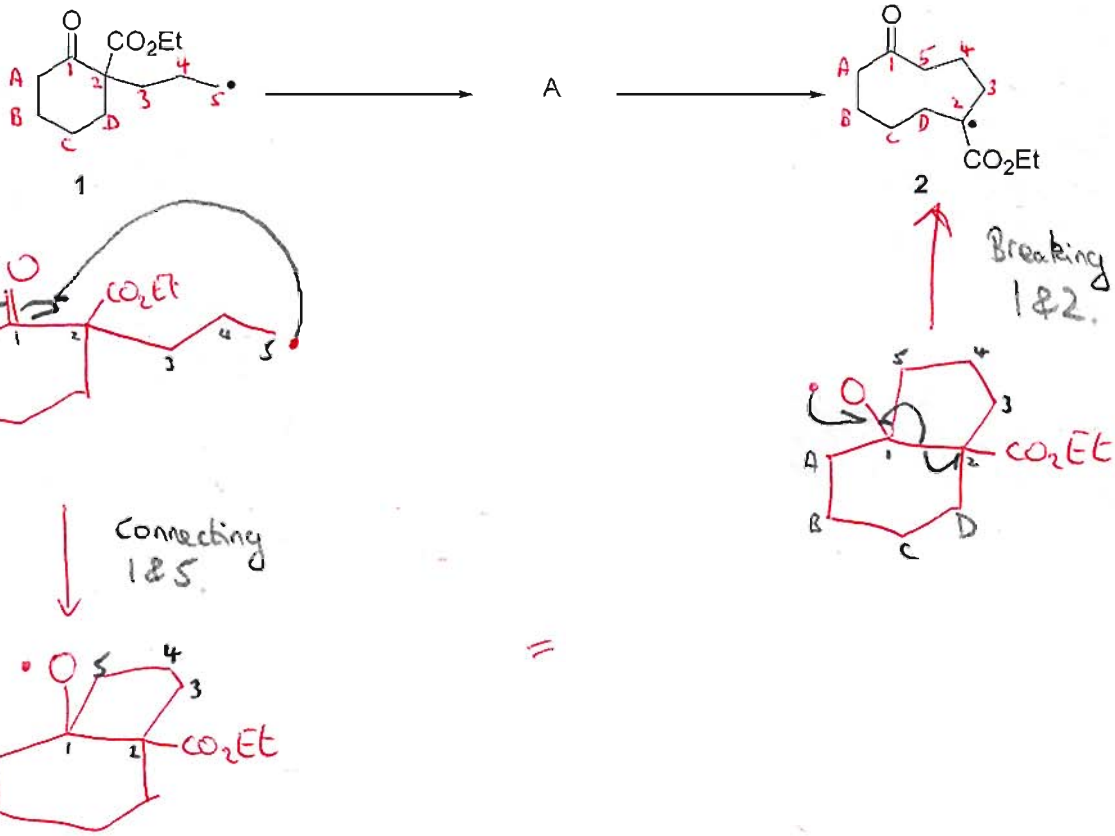
Addition
Abstraction
Dimerization
Disproportionation
Fragmentation

6-9) Write the mechanism for the interaction of this free radical initiator, tributyl tin hydride and alkyl iodide, which results in the formation of the corresponding alkyl radical.





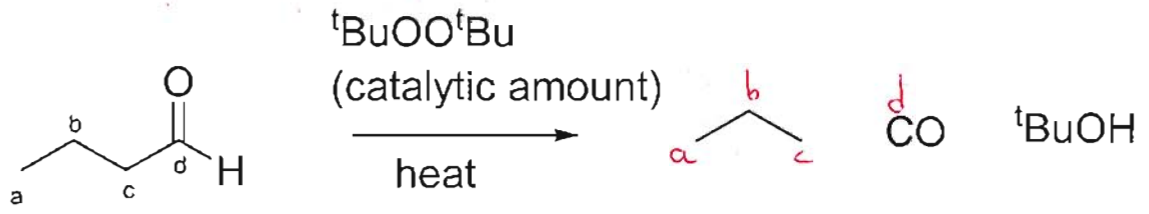
10-17) Radical **1** then undergoes an *exo cylization* with the ketone group. That intermediate (labelled as A) then undergoes ring opening to produce the radical **2**. Write the mechanism for these steps, which must include the structure of A.



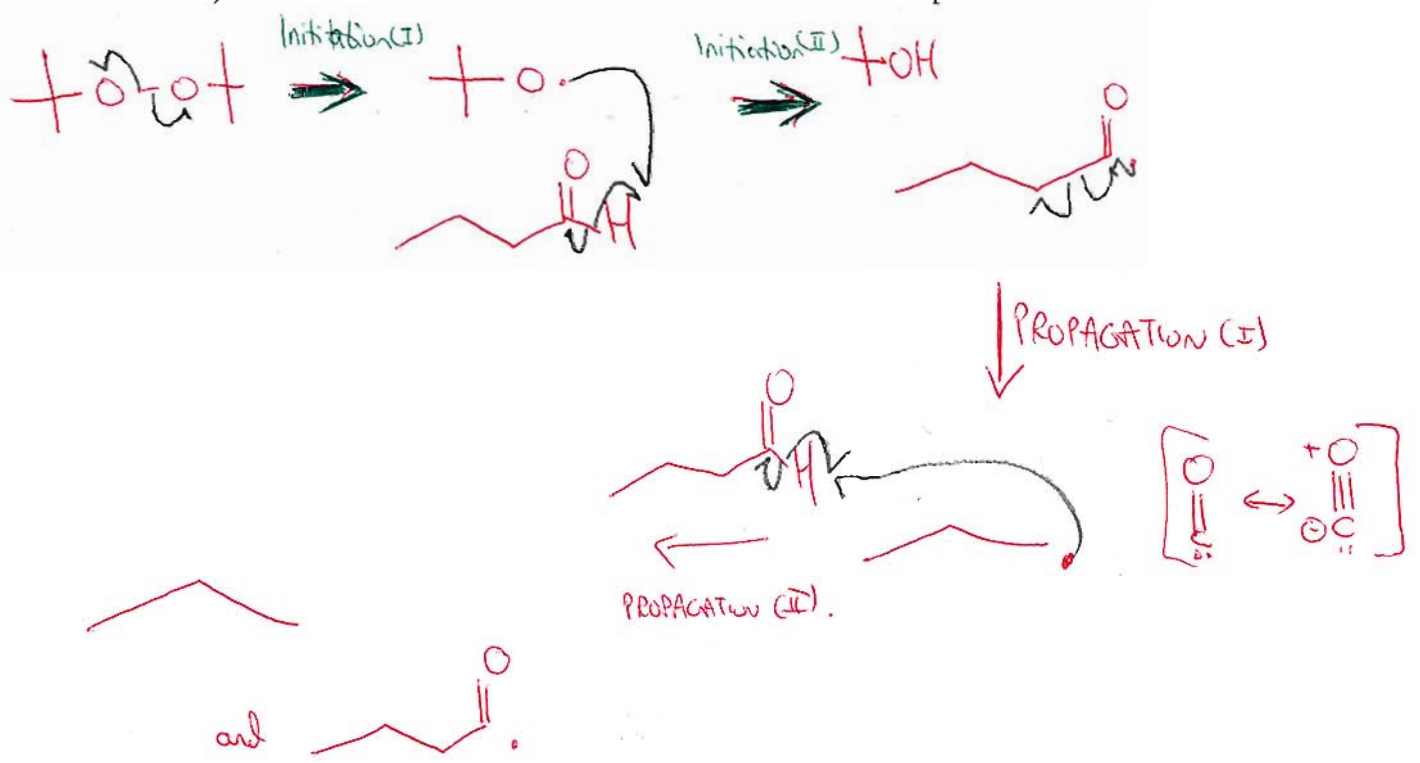
18) Give one reason why you think radical A undergoes ring opening.

Release of ring strain, more stable (alkyl substituted) radical.

19-20) For the below free radical chain reaction, indicate in the products where carbon atoms a, b, c and d end up.



21-25) Write the mechanism for the above free radical chain process.



Bonus Points: for the above mechanism, indicate the *initiation* step(s), and the *propagation* steps for this chain process.