

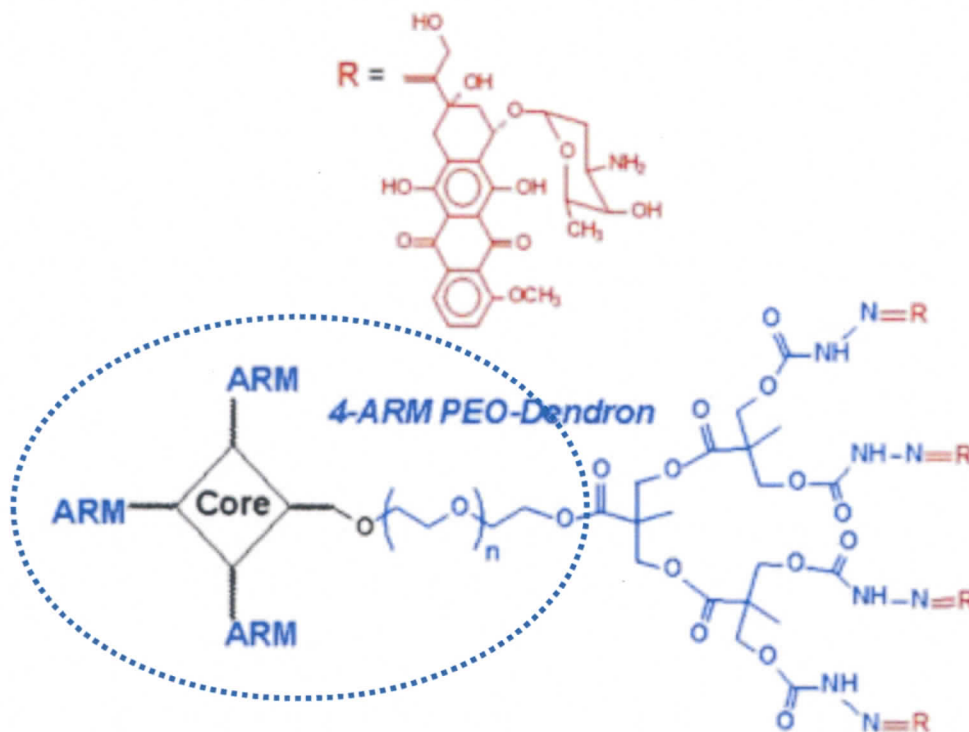
Your Name: ANSWER KEY [printed]

"On my honor, as an Aggie, I have neither given nor received unauthorized aid on this academic work."

_____ [signature]

Quiz #5, February 20, 2014, 10 pts
Polymer Chemistry, CHEM 466, Spring 2014
Texas A&M University, College Station, TX, USA

As reported in Fréchet, J. M. J. *J. Polym. Sci., Part A: Polym. Chem.* **2003**, 41, 3713-3725, hybrid linear-dendrimer star polymers have interesting chemical and physical characteristics that have been pursued toward drug delivery applications, among others. Please provide a retrosynthetic analysis with forward synthetic steps that could be used to prepare the structure below, copied from Figure 11 of the article. You should work back to the core being a 4-arm star PEO structure, which is highlighted as the dashed oval region of the structure (the PEO arms would be terminated with an alcohol functionality), i.e., you do not need to construct the core-linear arm star portion of the structure.

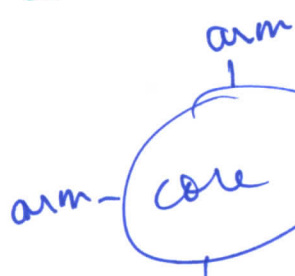


- answer on next page
- variations are possible
- the 4 steps involved in transformation of the alcohol chain ends of the dendrimer to the acid-labile drug conjugate may be unknown, unless the

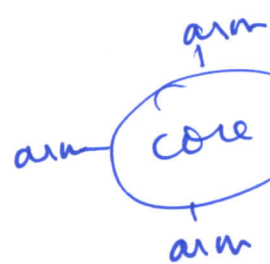
primary literature was consulted

attach drug

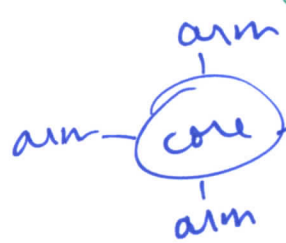
H⁺ cat. \uparrow



deprotect
TFA/MeOH



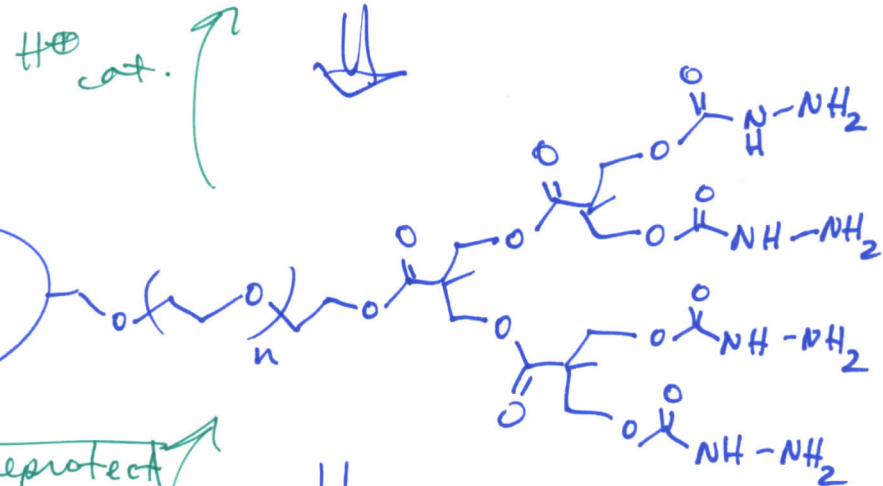
DMAP
(base)



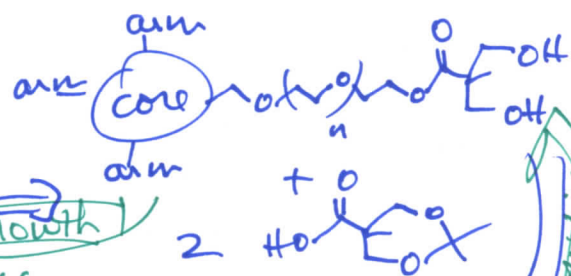
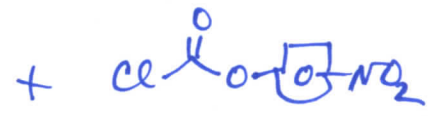
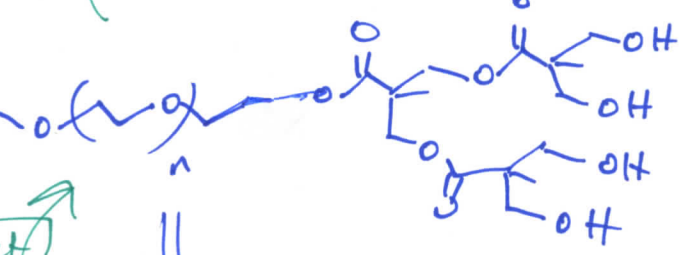
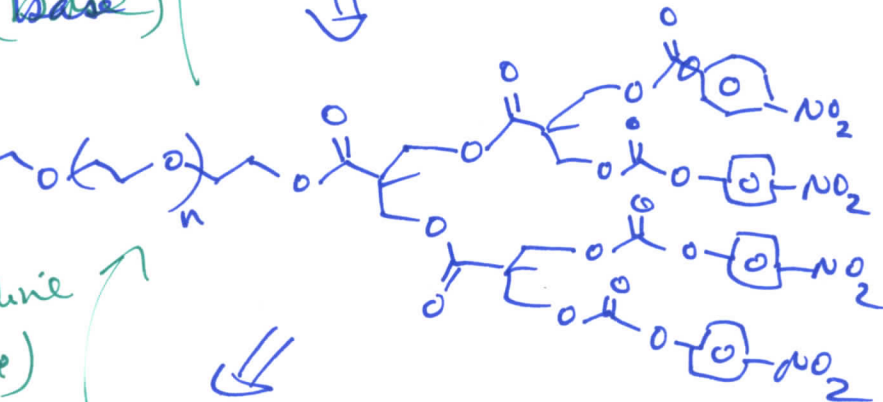
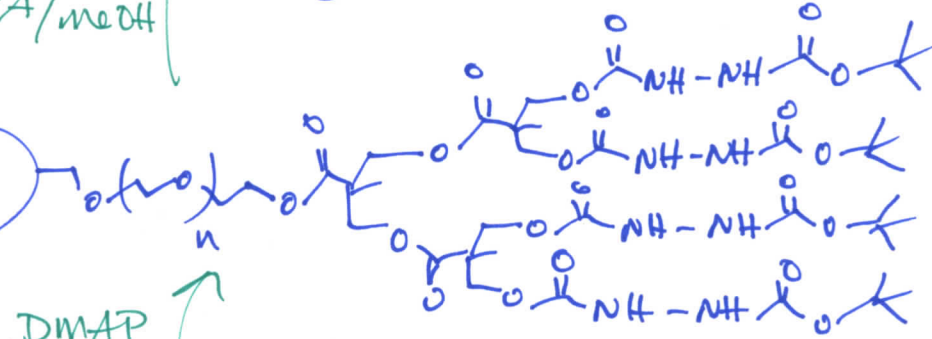
pyridine
(base)



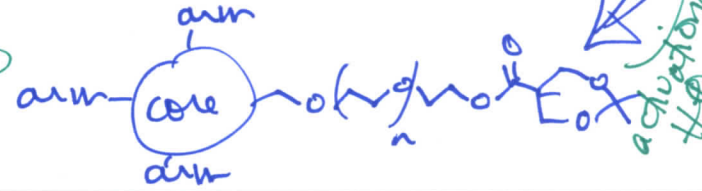
activation/deprotect
H⁺



+ O=O
(drug containing a ketone)



growth
DCC



activation/deprotect
H⁺