

**Birla Institute of Technology & Science, Pilani**  
**Pilani Campus, Rajasthan - 333 031**

2<sup>nd</sup> Semester 2017-2018, Mid-term examination

Course: CHEM F415

Part A: **Closed Book**

Time: 90 min.

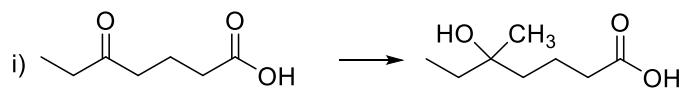
Course Title: Frontiers in Organic Chemistry

Max. Marks: 60

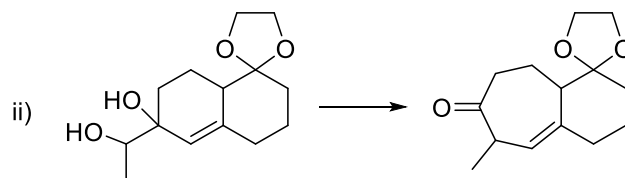
Instruction to students: Answer all questions and answer all parts of a question together

**Q. 1 a) Define chemoselectivity. How would you achieve following transformation?**

**5**

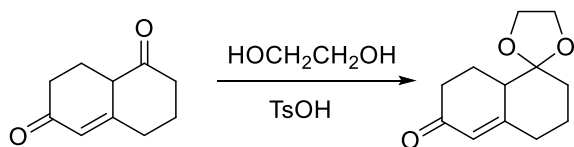


Without functional group protection.



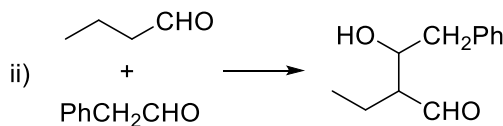
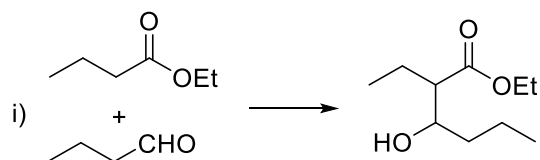
b) Explain why one of the two carbonyl group reacts chemoselectively in the following reaction.

**2**



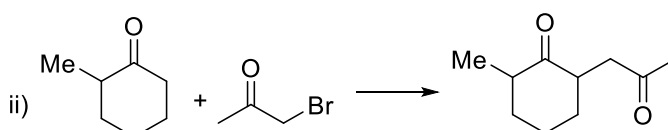
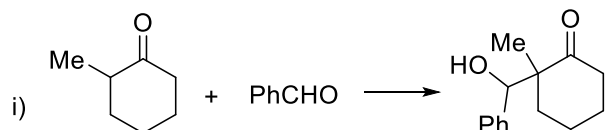
c) Reaction of one carbonyl compound with another, the aldol reaction, is a classical and important example in organic synthesis. In these reactions, chemoselectivity problem is encountered when we want two molecules to react in certain way. Mention chemoselectivity issue in the following reaction and provide appropriate solution (reagents) to resolve it.

**8**



d) Write appropriate conditions to achieve following transformation regioselectively.

**6**

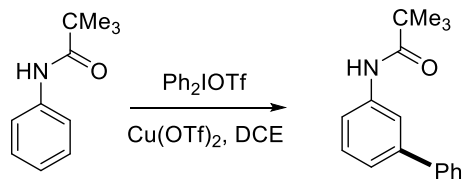


**Q. 2 a) Mention at least three approaches used in the transition metal catalyzed C-H activation.**

**3**

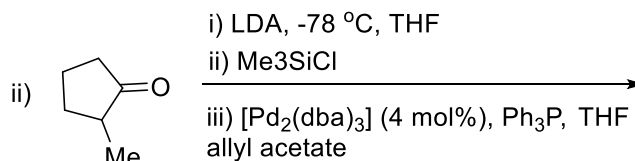
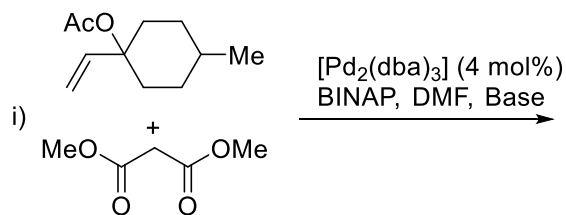
b) Gaunt group reported following copper-catalyzed arylation reaction (*Science* 2009, 323, 1593-1597), propose an appropriate mechanism for the regioselective meta C-H activation.

**5**

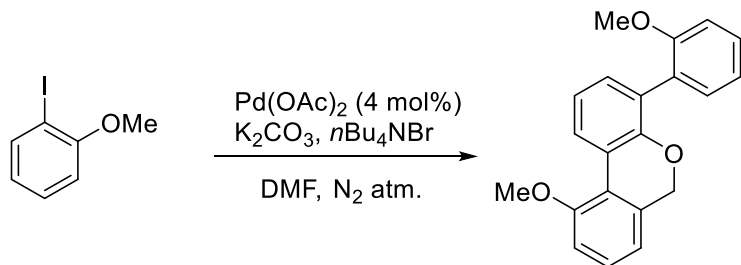


c) Write major product of the following transformations.

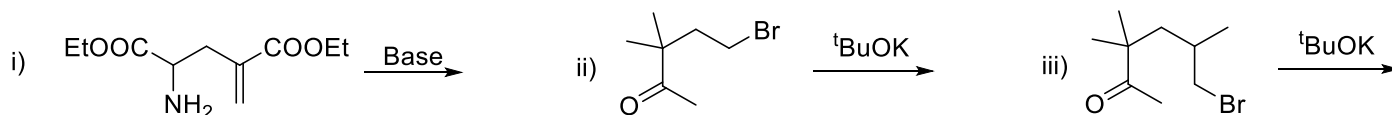
**4**



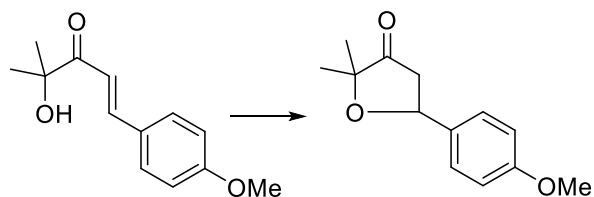
d) On treating 1-iodo-2-methoxybenzene with  $\text{Pd}(\text{OAc})_2$  in the presence of potassium carbonate in DMF, Dyker group (*Angew. Chem. Int. Ed.* 1992, 31, 1023) observed an unusual product. Explain formation of the observed product in this reaction. 5



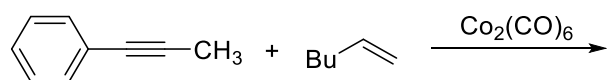
Q. 3 a) Considering Baldwin's rules for cyclization, write product of the following reactions and mention type of cyclization. 9



b) The following reaction works in acid but not in base, why? 5



c) Write mechanism of Pauson-Khand reaction. What is the expected major product from the following reaction? 8



-End of the examination-