



Register No:

Date: 19-11-2020

St. JOSEPH'S COLLEGE (AUTONOMOUS), BANGALORE – 27

**M.Sc. ORGANIC CHEMISTRY-III SEMESTER**

END SEMESTER EXAMINATION: NOVEMBER - 2020

**OCH 9219: ORGANIC SYNTHESIS- II**

(Retrosynthesis and modern aspects of organic chemistry)

Time: 2.5 Hrs

Max. Marks: 70

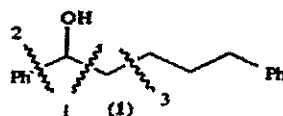
The question paper contains three parts and three pages

**PART-A**

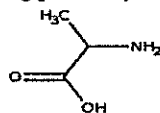
Answer any **SIX** questions

2x6=12

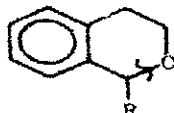
1. Among the disconnections shown for the following compound (**I**), which one gives umpolung synthon? Write the equivalents.



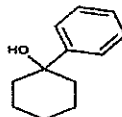
2. What is the problem of chemoselectivity you would encounter in the reaction of the following compound? Suggest any one method to solve the problem.



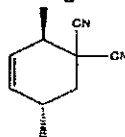
3. Among the functional groups, -COOH, -CH<sub>3</sub> and -NH<sub>2</sub>, which functional group/s can't be introduced on the aromatic ring directly? Give a method of introduction for one of them.
4. Write the cyclisation reaction corresponding to the disconnection shown.



5. What situation during synthesis would require the use of a protective group? what are the desired qualities of a protecting group?
6. Where would you preferably do disconnection of the following compound? Why?



7. Write the synthesis of the following compound and mention type of disconnection.

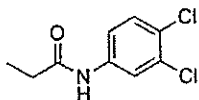


8. Bring about a difference and a similarity between aldehydes and nitro alkanes as synthetic reagents in the presence of a base.

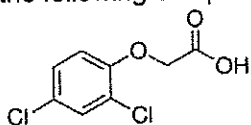
**PART-B**

Answer any **FOUR** of the following which should **compulsorily include any one of Q12, Q13 or Q14** **4x12=48**

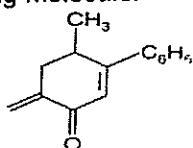
9. (a) Show one group C-X disconnection in the analysis and write the synthesis of the compound given below.



- (b) Carry out RSA of the following compound and give its synthesis.

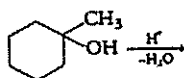


- (c) Amine functional groups demand extra precaution during synthesis. Why? With the help of suitable examples, give any two FGI to arrive at an amine functional group. **(4+4+4)**
10. (a) Explain with the help of an example each, how cyanides and  $\alpha$ -halo carbonyl compounds can be used as umpolung reagents?  
 (b) Write the protection of phenols as ethers and the corresponding deprotection.  
 (c) Show by RSA, indicating the type of disconnection, the synthesis of 3° alcohols.  
 (d) Synthesise the following molecule.

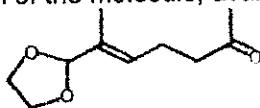


**(3+3+3+3)**

11. (a) What are the products expected in the following reaction? Which is the less probable product? Give a method to synthesise the less probable product.



- b) What are the differences between linear and convergent synthesis? Give the convergent synthesis of Ferruginol.  
 (c) Give the linear synthesis of  $\alpha$ -sinensal and  $\beta$ -sinensal starting from the following protected form of the molecule, available at BASF.



**(4+5+3)**

12. (a) Write any two methods to synthesise saturated three membered heterocyclic ring.  
 (b) Show how amide activation is done by conversion to amidene and  $\alpha$ -chloroenamine.  
 (c) Write the mechanism of transition metal catalysed activation and decarboxylative cleavage of C-N bond.  
 (d) Write the structure of Hantzsch ester. What are its applications? **(3+3+3+3)**

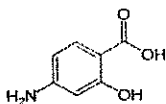
13. (a) Show the addition of enamides to arynes, involving annulation of arynes, leading to synthesis of papavarine.  
 (b) Give the full form of LiTMP and TBAT. What is their application in organic synthesis involving arynes?  
 (c) Give the general structures of *o*-QDM, *o*-QM and aza-*o*-QM and classification as normal and inverse demand dienes. What does NHC stand for? Mention any one application of NHC? (4+4+4)
14. (a) How can you construct benzobicyclo[2.2.2]octane skeleton by photoinduced intermolecular Diels-Alder reaction, using *o*-QDM?  
 (b) Write the full form of LiHMDS and what is a hypervalent iodine? What is their special application in oxidative coupling reactions?  
 (c) Write the possible reaction course of coupling of indoles and carvone. (4+4+4)

**PART-C**

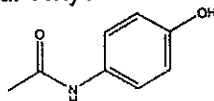
Answer any **TWO** of the following

**2x5=10**

15. (a) What would be the order of reactions in the synthesis of the following compound?

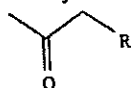


- (b) In the synthesis of paracetamol (structure is given below), it is important to keep -OH group unionized. Why?

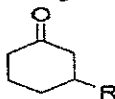


(3+2)

16. (a) How is an acetylide useful to synthesise the following?

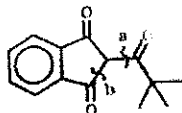


- (b) How can you prepare the following in one step?

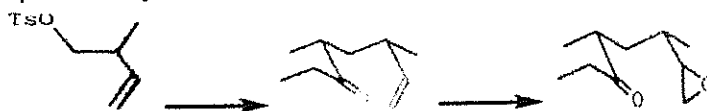


(3+2)

17. (a) Which of the indicated disconnections in the structure shown below, leads to a feasible reaction? Name the type of disconnection you prefer to synthesise this molecule.



- (b) Mention the reagents and conditions for the following intermediate steps in the synthesis of multistriatin.



(2+3)