

**M.Sc. CHEMISTRY
FIRST SEMESTER
ORGANIC CHEMISTRY
MSC – 101**

**SET
A**

[USE OMR SHEET FOR OBJECTIVE PART]

Duration : 3 hrs.

Full Marks : 70

Time: 30 min.

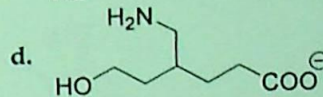
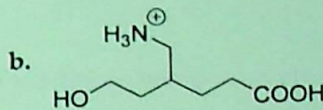
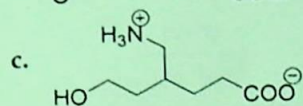
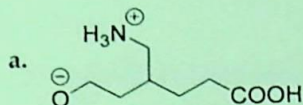
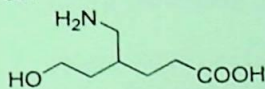
(Objective)

Marks: 20

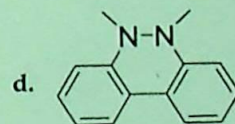
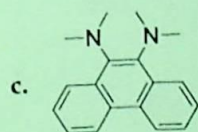
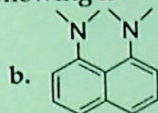
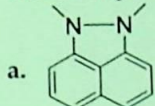
Choose the correct answer from the following:

1X20=20

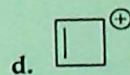
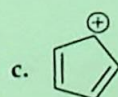
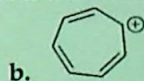
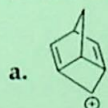
1. If the pKaH of primary amine is 10.7, pKa of carboxylic acid and aliphatic alcohol are 4.5 and 16 respectively, then the actual form of the following compound at pH 12 will be?



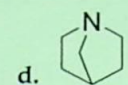
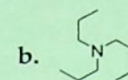
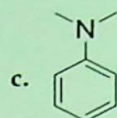
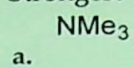
2. The example of proton sponge among the following is



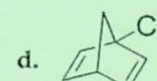
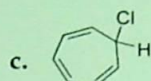
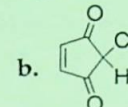
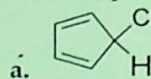
3. Which one among the following carbocations is most stable?



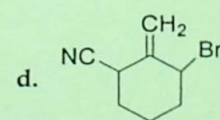
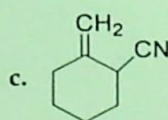
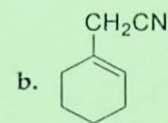
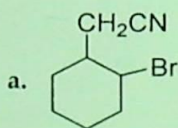
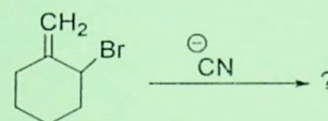
4. Strongest base among the following is



5. The compound that reacts rapidly with AgNO_3 is



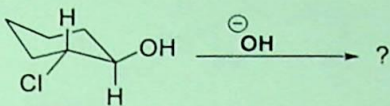
6. What is the structure of the product of the following nucleophilic substitution reaction?



7. An example of a soft nucleophile is



8. Find the product of the following NGP reaction



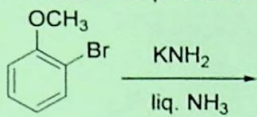
trans-2-chlorohexanol

- a.
- b.
- c.
- d.

9. Which of the following is not true about nucleophile?

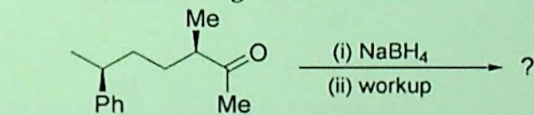
- a. Nucleophiles are Lewis's acids
- b. All molecules or ions with a free pair of electrons are nucleophiles
- c. Nucleophiles donate an electron pair to an electrophile to form a chemical bond
- d. A nucleophile becomes attracted to a positive charge.

10. Predict the product of the following reaction

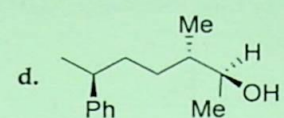
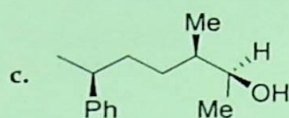


- a.
- b.
- c.
- d.

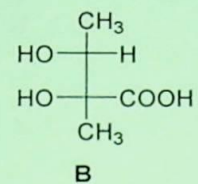
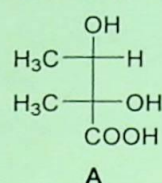
11. Product in the following reaction will be:



- a.
- b.



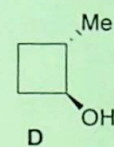
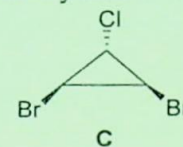
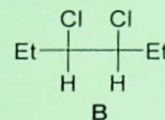
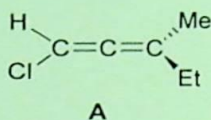
12. Following two molecules A and B



- a. Homomers
c. Diastereomers

- b. Enantiomers
d. Constitutional isomers

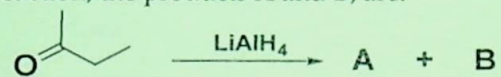
13. Which of the following molecules will be optically inactive?



- a. A & B
c. A & C

- b. B & C
d. C & D

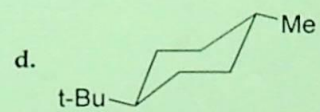
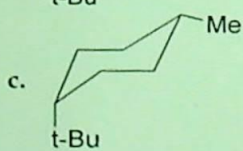
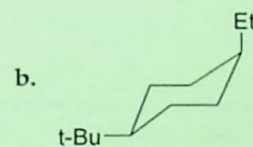
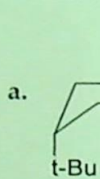
14. In the following reaction, the products A and B, are:



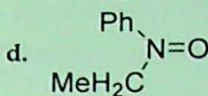
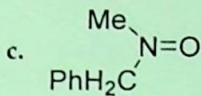
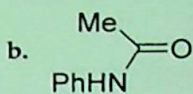
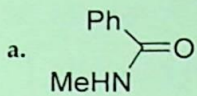
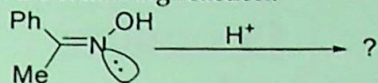
- a. Enantiomers
c. Homomers

- b. Diastereomers
d. Regiomers

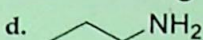
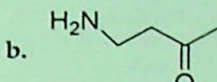
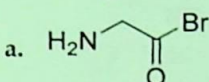
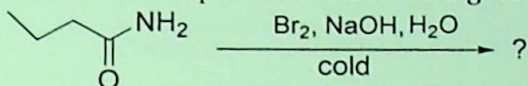
15. Which of the following conformers will be most stable?



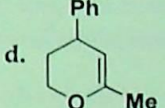
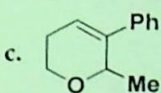
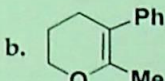
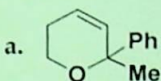
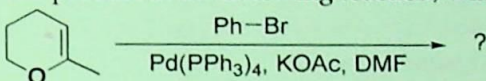
16. What will be the product in the following reaction?



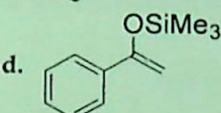
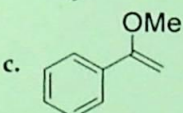
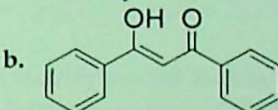
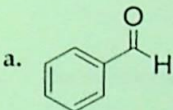
17. What will be the product in the following reaction?



18. The product in the following reaction, will be:



19. Which one can be used as the nucleophile in the Mukaiyama aldol addition reaction?



20. Vilsmeier-Haack reaction is related to

- a. acetylation
c. halogenation

- b. formylation
d. nitration

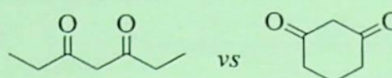
(Descriptive)

Time : 2 hrs. 30 mins.

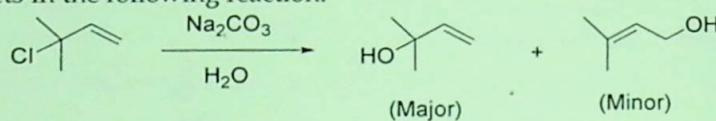
Marks : 50

[Answer question no.1 & any four (4) from the rest]

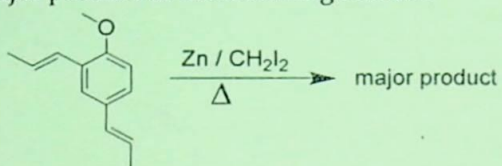
1. a. Which of the following compound is having lowest pKa? Explain 2+3+2+2+1=10



- b. What is allylic rearrangement? Justify the formation of major and minor products in the following reaction.

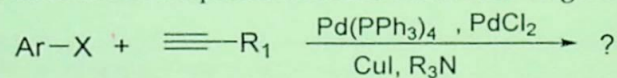


- c. Write the major product of the following reaction

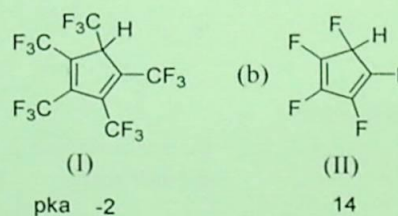


- d. A given pair of enantiomers is found to have d-isomer in 70% enantiomeric excess. Find the percentage of each isomer.

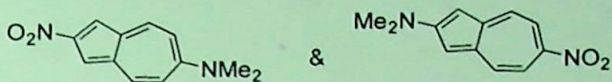
- e. Write down the structure of the product formed in the following reaction.



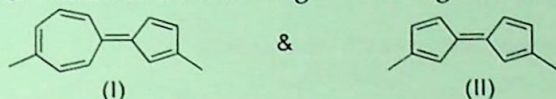
2. a. Why the pka value of the compound (I) is very low (-2) while the pka value of the compound (II) is moderate (14)? Explain 3+4+3=10



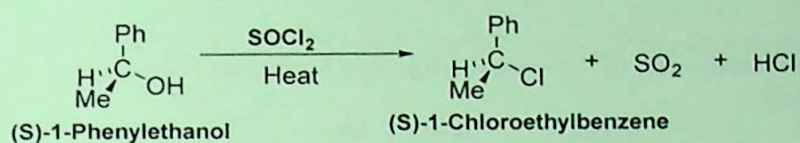
b. Which of the following compound will have higher dipole moment and higher λ_{\max} ? Explain.



c. Which of the following will undergo Cis-Trans isomerization? Explain

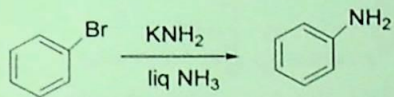


3. a. Discuss the mechanism and stereochemistry of the following reaction. 5+5=10



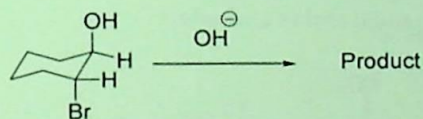
Give two evidences for the formation of an ion pair in the above mechanism

b. What is benzyne? Propose a mechanism for the following reaction.



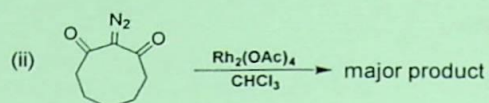
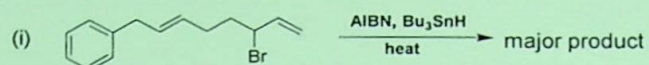
Give two convincing evidences for the existence of benzyne intermediate in your proposed mechanism.

4. a. Explain neighbouring group participation reaction with example. What is anchimeric assistance? Write the structure of the product of the following reaction and suggest its mechanism. 5+5=10

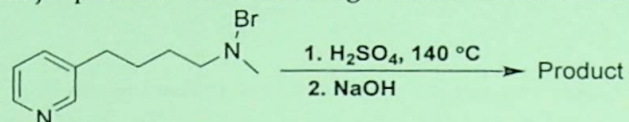


b. Write a short note on Vilsmeier-Haack reaction.

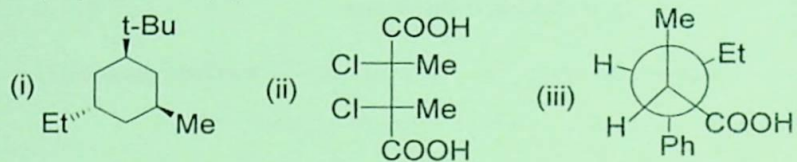
5. a. Write the major product of the following reactions with mechanism. 6+4=10



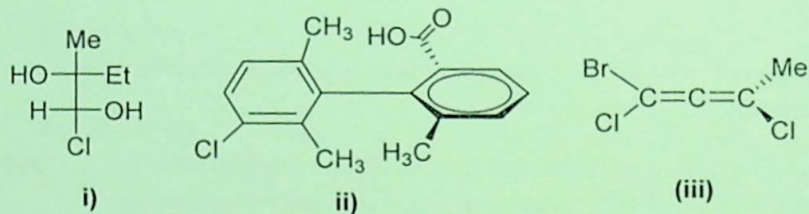
b. Write the major product of the following reaction with mechanism.



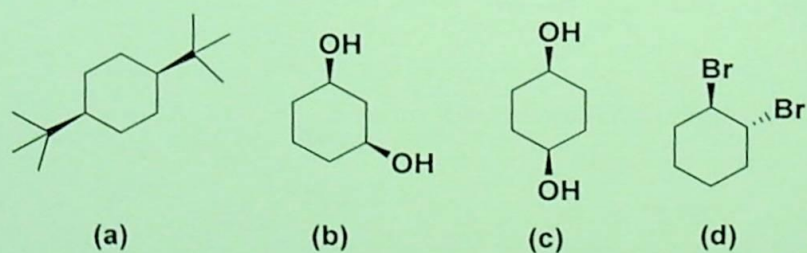
6. a. Draw Chair conformation for (i), Newman's projection for (ii) and Fisher projection for (iii). 3



b. Give R/S configurations for each of the chiral systems in the following molecules. 3

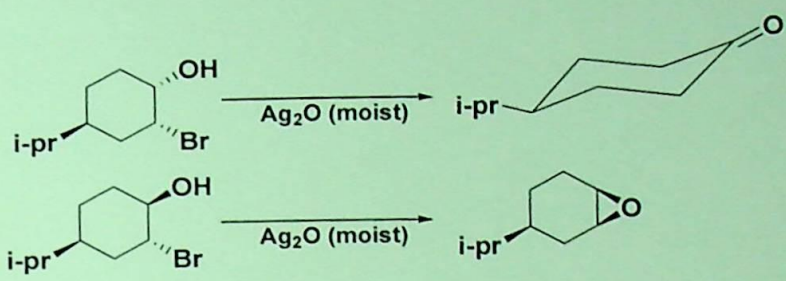


c. Draw the possible conformations for the following molecules, mention which of the two possible conformations will be most stable and why? 4



4

7. a. Justify the formation of the products in the following reactions.

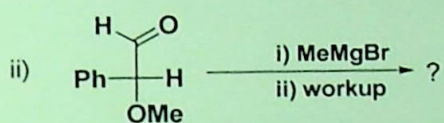
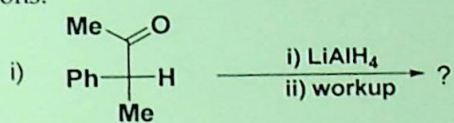


2

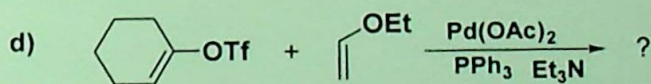
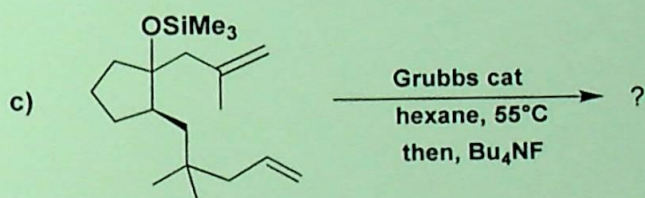
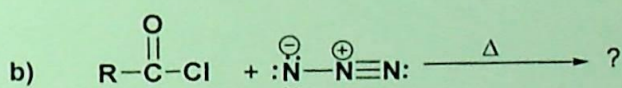
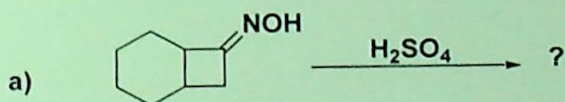
b. All stereospecific reactions are also stereoselective reactions. Explain.

4

c. Use Cram's/anti Cram's rule to predict the major product in the following reactions:



8. Write down the product in the following reactions. Give mechanism for any two reactions.

2×2+3
×2=10

[9]

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