

Total number of printed pages-6

14 (CHM-3) 303

2018

CHEMISTRY

Paper : CH 303

(Foundation of Organic Synthesis)

Full Marks : 60

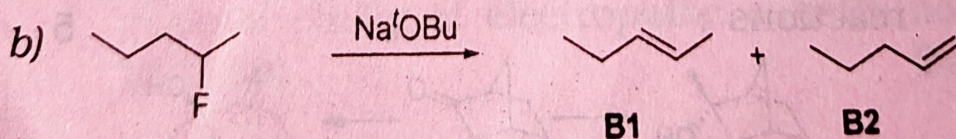
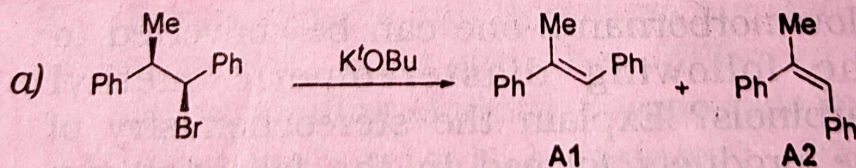
Time : Three hours

The figures in the margin indicate full marks for the questions.

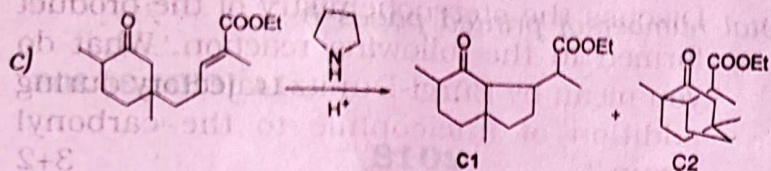
Answer **any 12 (twelve)** questions.

1. What is thermodynamic and kinetic enolate? Give one example for each showing formation of C-C bond. Identify the correct products in the following reactions :

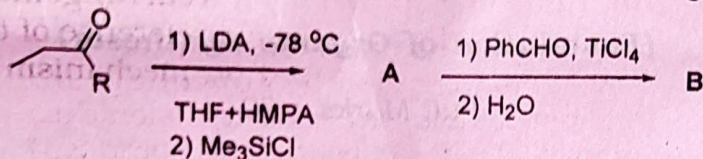
1+1+3



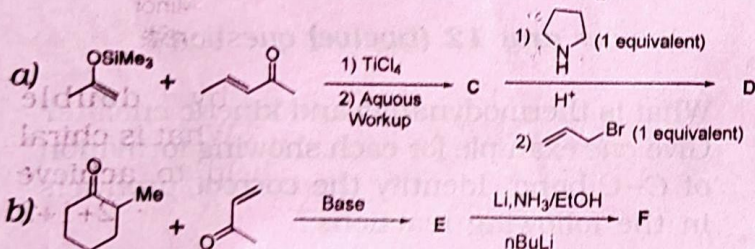
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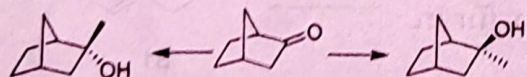
2. Complete the following sequence of reactions and provide brief explanations for each step of the transformation. 5



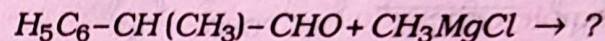
3. Complete the following reactions (*any one*): Show the plausible mechanism for the Mukaiyama-Michael reaction steps. 5



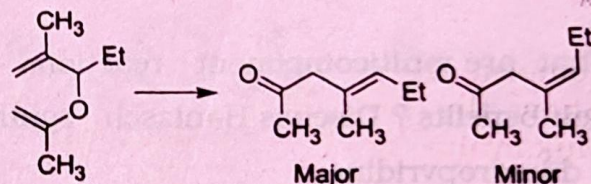
4. How norbornan-2-one can be converted to the following diastereomeric methyl carbinols? Explain the stereochemistry of the products formed in the following two reactions: 5



5. Discuss the stereochemistry of the product formed in the following reaction. What do you mean by Bürgi-Dunitz trajectory during addition of nucleophile to the carbonyl group? 3+2



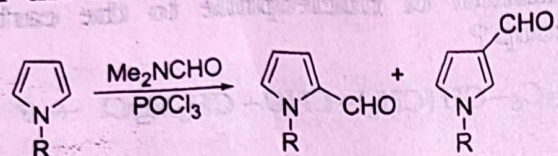
6. In the following Claisen rearrangement explain the stereochemical preference of the product formation based on mechanism of the reaction. 5



7. What do you mean by double stereodifferentiating reaction? What is chiral auxiliary? How they can help to achieve enantioselective synthesis? 2+1+2

8. Furan, pyrrole and thiophene are said to be aromatic. How are they different from corresponding aliphatic compounds in their physicochemical behavior? Discuss regioselectivity of electrophilic substitution in furan. 2+3

9. Vilsmeier formylation of *N*-alkylpyrroles is shown below. Give a plausible explanation for the observed results. 5

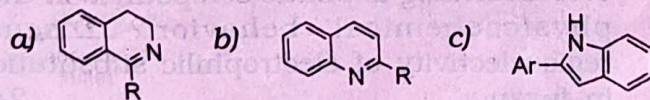


R	A	B
Me	only A	—
<i>tert</i> -Bu	1	14
PhSO ₂	only A	—

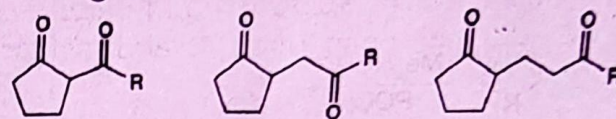
10. What are multicomponent reactions and their benefits? Discuss Hantzsch synthesis of dihydropyridine. 1+4

11. State Hofmann-Löffler-Freytag reaction. Discuss its mechanism. 2+3

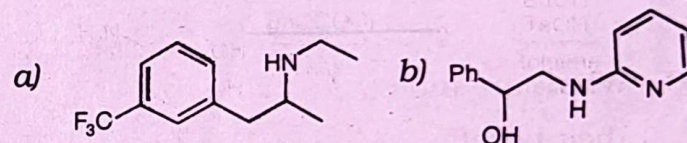
12. How would you synthesise the following molecules — discuss (**any two**): 2.5×2



13. Using suitable disconnection strategies, suggest plausible synthetic plans for the following diketones: 5



14. Perform retrosynthetic analysis for the following target molecules and show how the forward synthesis can be accomplished. 5



15. Identify the major products for the following reactions and provide brief mechanistic justifications in each case (**any two**): 2.5×2

