

- (b) What is the role of cyclophosphamide as a cancer chemotherapeutic agent? Why is it called a prodrug? Explain by providing structural representations to highlight the chemistry involved in the process. 5
- (c) What are the different types of binding possible by alkylating agents? 2
10. (a) What are antimetabolites? Explain the mechanism of action of any pyrimidine antagonist that acts as an antimetabolite and is used to address the treatment of cancer. 6
- (b) What are tubulins? Describe the role of tubulin in cell division and highlight how tubulins of cancer cells/tissues can be disrupted to treat cancer. 4
- (c) Schematically explain the formation of CD8⁺-T cells as a by-product of post-PDT. What is the driving force for the production of such T-cells? 4

PG (CBCS) EVEN SEMESTER EXAMINATION, 2023

CHEMISTRY

4th Semester

Course No. : CHMCC - 403 (B)

(Organic Chemistry-IV)

Full Marks : 70

Pass Marks : 28

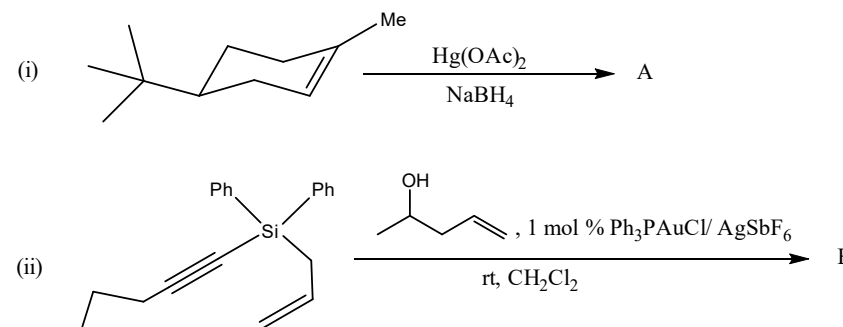
Time : 3 hours

The figures in the margin indicate full marks for the questions

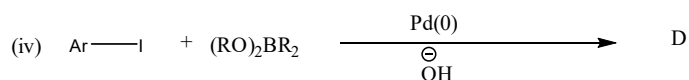
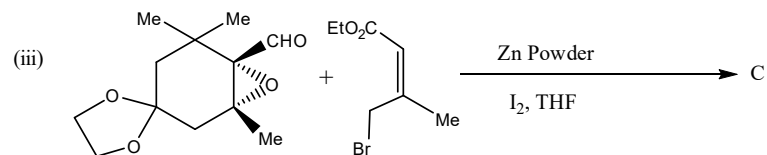
(Answer five questions, selecting one from each unit)

UNIT-I

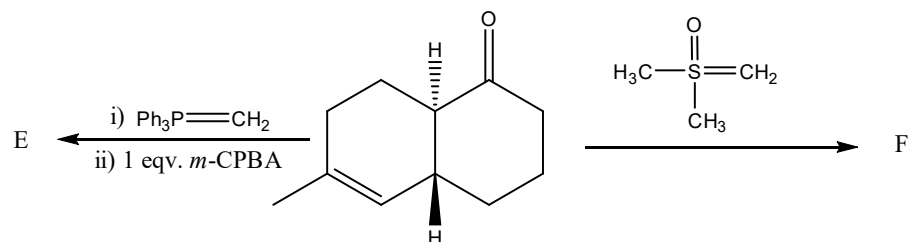
1. (a) Delineate the fate of the following reaction with mechanism. 2+3+2+3= 10



(2)

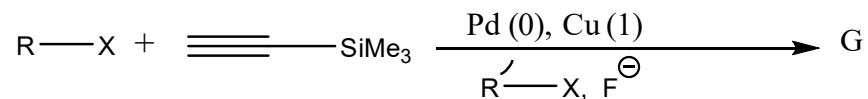


(b) Write the product(s) and plausible mechanism for the following conversion. 4



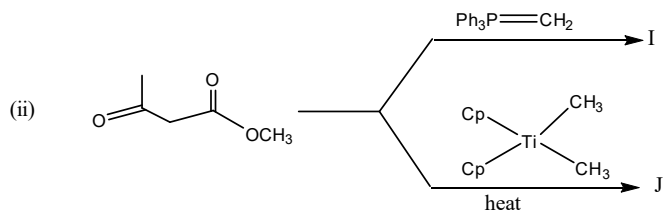
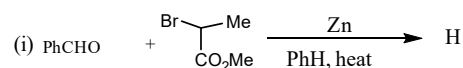
2. (a) Draw the catalytic cycle of the following reaction.

3+2=5



Carry out the similar reaction with the low cost alternatives of

(b) Write the product (s) and suggest plausible mechanism. (show stereochemistry wherever necessary) 2+4=6



(7)

(b) Illustrate the induced fit model enzyme-substrate binding. 3

(c) Discuss the binding interaction of alcohol and phenols with drug target. 3

(d) Given the log P values of benzene, chlorobenzene and benzamide as 2.13, 2.84 and 0.64 respectively. Considering the substituent constant for Cl and CONH₂ being 0.71 and -1.49 respectively, calculate the log p for *m*-chlorobenzamide. 2

(e) What is therapeutic index? 2

8. (a) What is ADMETox in drug design? What are the factors affects the adsorption of drugs in the body? 1+2=3

(b) Explain the occupancy theory of drug activity. 3

(c) Discuss the natural product sources of drug lead 3

(d) What is artificial enzyme? What is cyclodextrin? 2+1=3

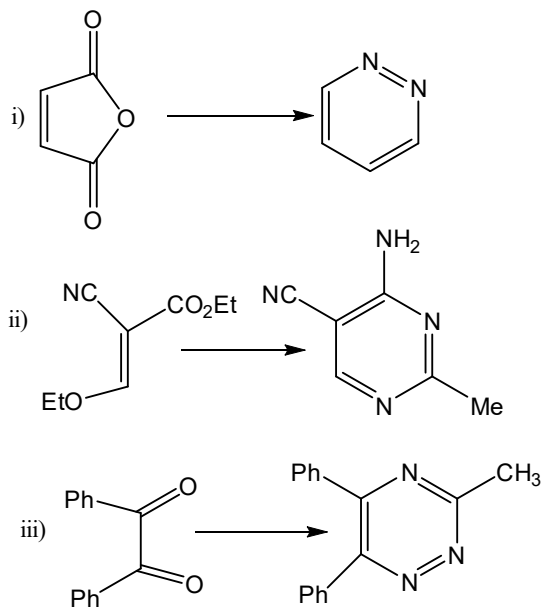
(e) What is Hammett substituent constant? 2

UNIT-V

9. (a) Describe the general process and mechanism of immunophotodynamic therapy (IPDT) with the aid of a schematic representation and by highlighting the process of immunogenic cancer cell death induced by IPDT. 7

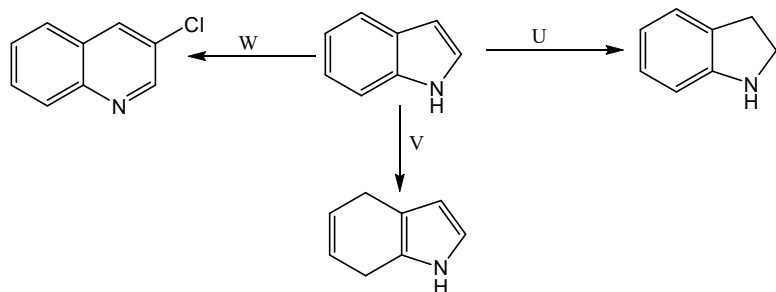
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(6)



(c) Complete the following reactions.

3



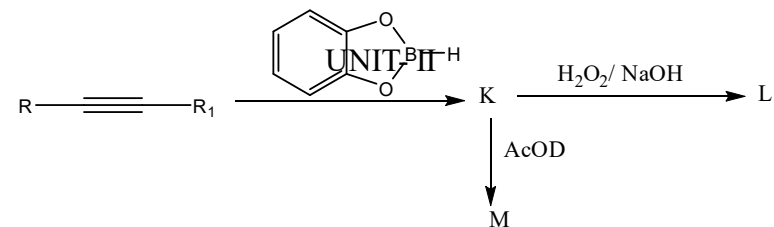
UNIT- IV

7. (a) What is allosteric binding? Describe allosteric inhibition of an enzyme. 1+3=4

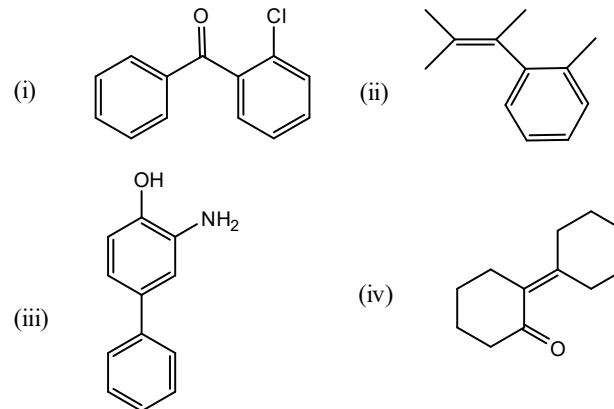
(3)

(c) Complete the following reaction

3



3. (a) What are 'synthon' and 'retron' in retrosynthetic depiction of a compound? Provide example. 2
- (b) Provide the retro synthesis followed by forward synthesis for the following compounds: (2+1)×4= 12

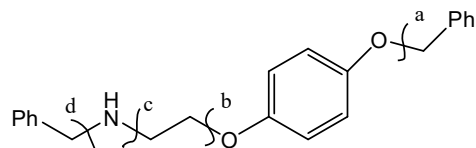


4. (a) Give the expansions and explain the following terms used in retrosynthetic description using suitable examples:
- FGA
 - FGR
 - FGI
- 3

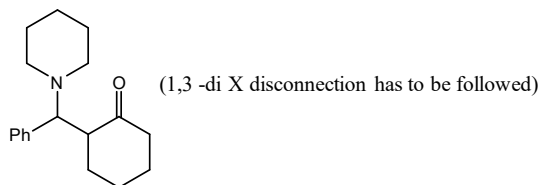
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(4)

- (b) Four possible alternative sites of disconnection are indicated for the following compound: $2+(1+2)+2=7$



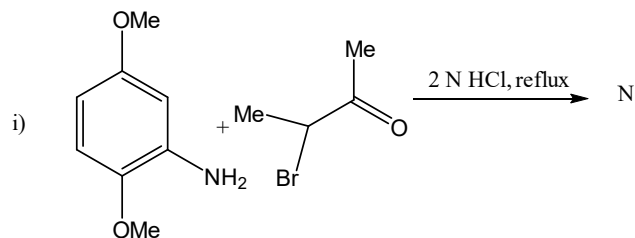
- (i) Analyze all four pathways (a, b, c and d).
 (ii) Chose the best retrosynthetic approach and provide logical support for its superiority over the other three.
 (iii) Design synthesis of the compound based on your analysis.
- (c) Carry out retrosynthesis of the following compound with forward synthesis as per instruction. $2+1=3$



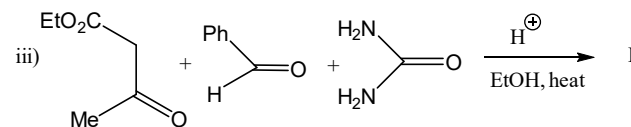
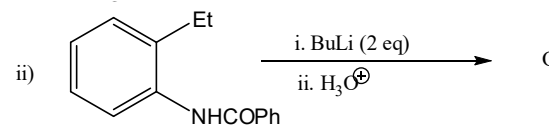
- (d) What is umpolung? 1

UNIT- III

5. (a) Provide the major product with plausible mechanism of the following reaction(s). $2+2+3=7$

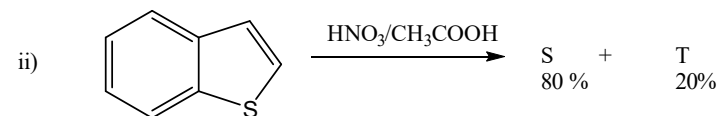
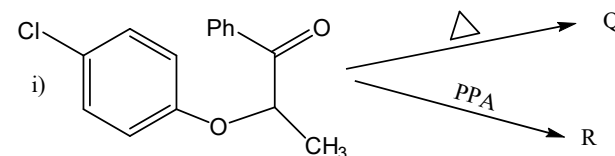


(5)



- (b) What will happen if indole is treated with p-N, N- dimethyl amino benzaldehyde in presence of sulphuric acid? Explain the observation with proper mechanism of the reaction. 3

- (c) Identify the product of the following reaction(s). $1 \times 4 = 4$



6. (a) Why thiazine compounds are biologically important? Describe synthesis of 1,3 thiazine derivative from an aromatic aldehyde, thiourea and alkyne compound. Provide plausible mechanism of this reaction. $1+3=4$

- (b) Carry out the following transformation with suitable reagents and reaction conditions. $2+3+2=7$

(Turn Over)