*Total No. of Questions: 6* *Total No. of Printed Pages:3*

**Enrollment No.....**

# Faculty of Science

## End Sem (Even) Examination May-2022

## CH5CO06 Organic Chemistry -II

Programme: M.Sc. Branch/Specialisation: Chemistry

**Duration: 3 Hrs.** **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. When considering electrophilic aromatic substitution reactions electron withdrawing substituents (e. g. nitro) are described as... **1**

(a) Ortho/para directing and activating
(b) Ortho/para directing and deactivating
(c) Meta directing and activating
(d) Meta directing and deactivating

ii. Which halogen nucleophile is weakest in polar, aprotic solvents? **1**

(a) $I^-$ (b) $F^-$ (c) $Cl^-$ (d) $Br^-$

iii. The reaction of N-bromosuccinimide (NBS) with cyclohexene in the presence of a radical initiator leads to which one of the following products? **1**

(a) 1,1 Dibromocyclohexane (b) 3-Bromocyclohexene
(c) Bromocyclohexane (d) 1,2- Dibromocyclohexane

iv. Which one of the following statements is incorrect? **1**

(a) In the electrophilic addition of HBr to an alkene, there is always an equal chance of syn-and anti-additions.
(b) The stereo chemistries of the products of the syn-and anti-additions of HBr to but-2-ene are different.
(c) In syn addition of HBr to an alkene, H and Br add to the same side of the C=C bond.
(d) In anti-addition of HBr to an alkene, H and Br add to opposite sides of the C=C bond.

v. All but one of the following terms describes the reaction of haloacids with unsymmetrical alkene by a non-radical route. Which term is incorrect? **1**

(a) Markovnikov addition (b) Regioselective
(c) Electrophilic addition (d) Concerted mechanism

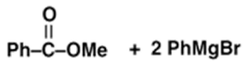
P.T.O.

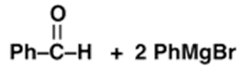
vi. The hydroboration, addition of borane reaction is……in nature? **1**

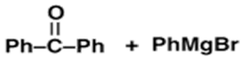
(a) Regioselective (b) Stereoselective

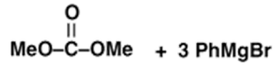
(c) Chemoselective (d) Stereospecific

vii. Which pair of reactants for a Grignard reaction does not give triphenylmethanol after an aqueous media… **1**

(a) 


(b) 


(c) 


(d) 


viii. Which of the following order is incorrect for the rate of $E_2$ reaction? **1**

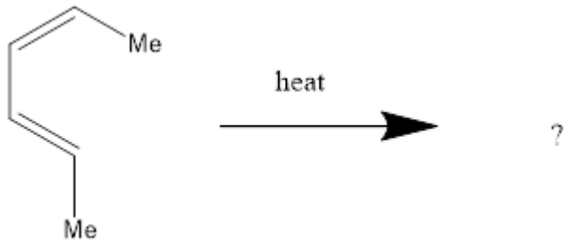
(a) 5-Bromocycloheptene > 4-Bromocycloheptene

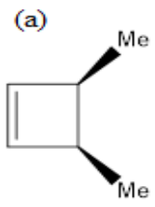
(b) 2-Bromo- I -phenylbutane > 3-Bromo- I-phenylbutane

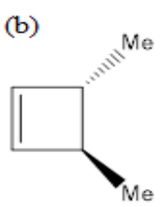
(c) 3-Bromocyclohexene > Bromocyclohexane

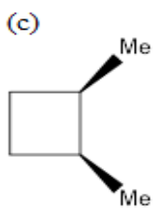
(d) 3-Bromo-2-methylpentane > 2-Bromo-4-methylpentane

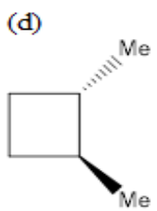
ix. What will be the possible product? **1**



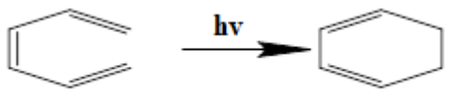

(a) 

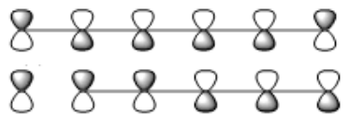

(b) 

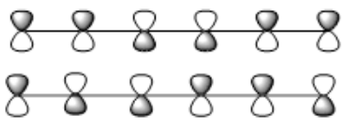

(c) 


(d) 


x. According to FMO (Frontier Molecular orbital theory, the highest occupied molecular orbital (HOMO) of Hexatriene in the following reaction is- **1**




(a) 

(b) 

(c) 

(d) 



Q.2 i. Write the short note on IPSO attack with mechanism. **2**

ii. Explain the Arenium Ion mechanism with suitable examples. **3**

iii. Describe SNAr mechanism with suitable examples. **5**

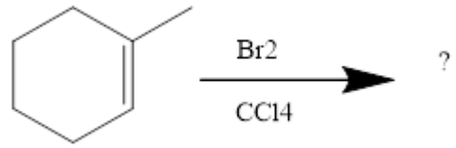
OR iv What is Vilsmeir reaction? Explain its mechanism? **5**

Q.3 i. Write the short note on free radicals and its stability order. **3**

ii. Explain Allylic halogenation with the help of NBS. **7**

OR iii. Explain the effect of solvents on reactivity with suitable examples. **7**

Q.4 i. Explain the reaction mechanism and possible products. **3**




ii. Explain the reaction mechanism of unsymmetrical alkene with unsymmetrical halo- acids and its energy profile diagram. **7**

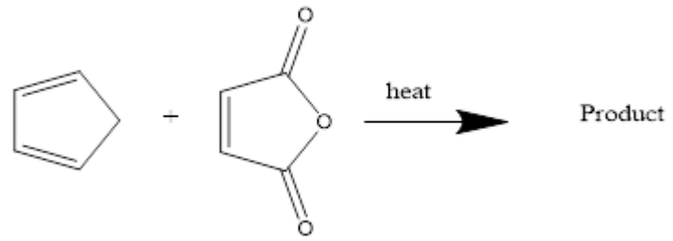
OR iii. What is Michael reaction? Describe its stepwise mechanism. **7**

Q.5 What are the differences between $E_2$ and $E_1$ reactions? **3**

Explain the reaction mechanism of organolithium reagents with suitable examples. **7**

OR What is Grignard reagent? Explain the mechanism of Grignard reagent on to carbon-hetero multiple bonds with the example. **7**

Q.6 i. Explain the possible and the stereochemistry (Endo/Exo) of the product? **3**




ii. What is Sigmatropic reaction? Describe it with the help of claisen condensation? **7**

OR iii. What is Electrocyclic reaction? Explain the stereochemistry of this reaction with the example of 1,3 butadiene system. **7**

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# Scheme of Marking

Faculty of Science

End Sem (Even) Examination May-2020

Organic Chemistry-II CH5CO06

Programme: M.Sc. | Branch/Specialisation:

**Note: The Paper Setter should provide the answer wise splitting of the marks in the scheme below.**

| | | | |
|---|---|---|---|
| Q.1 | i) | d | 1 |
| | ii) | a | 1 |
| | iii) | b | 1 |
| | iv) | a | 1 |
| | v) | d | 1 |
| | vi) | a | 1 |
| | vii) | b | 1 |
| | viii) | a | 1 |
| | ix) | a | 1 |
| | x) | d | 1 |
| | | | |
| Q.2 | i. | 2 Ipso attack-(1) Mechanism-(1) | 2 |
| | ii. | 1.5+1.5 Arenium ion mechanism (1.5) example-(1.5) | 3 |
| | iii. | 2+3 $S_NAr$-(2) examples (3) | 5 |
| OR | iv. | 2+3 Vilsmeir Rea (2) Mechanism (3) | 5 |
| | | | |
| Q.3 | i. | 1.5+1.5 Definition (1.5) stability order (1.5) | 3 |
| | ii. | 3+4 Definition (3) NBS Rea & mech. (4) | 7 |
| OR | iii. | 2+2+3 effect of Solvent-(2) example-(3) Various Solvent (Protic, aprotic etc.)-(2) | 7 |
| | | | |
| Q.4 | i. | 1+2 Rea. products (1) Mech. (2) | 3 |
| | ii. | 2+3+2 Rea-(2), Mech.-(3) ~~Pro~~ Energy profile diagram (2) | 7 |
| OR | iii. | 3+4 Michael Rea-(3) Mechanism-(4) | 7 |
| | | | |
| Q.5 | i. | 3 Difference (3) | 3 |
| | ii. | 3+4 Definition & Rea (3) Mech.-(4) | 7 |
| OR | iii. | 3+4 Definition (3) Reactions & mech.-(4) | 7 |
| | | | |
| Q.6 | | | |

| | | | |
|---|---|---|---|
| | i. | 1.5+1.5 product (1.5) Stereo-(1.5) | 3 |
| | ii. | 2+2+3 Definition (2) Cleisen cond-(2) Mech-(3) | 7 |
| | iii. | 3+4 Definition (3), eg. with stereo-(4) | 7 |

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