

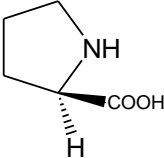
Duration: 3 hours

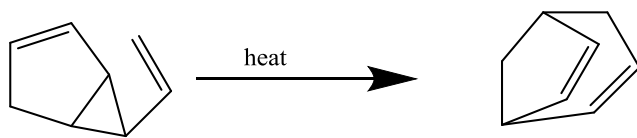
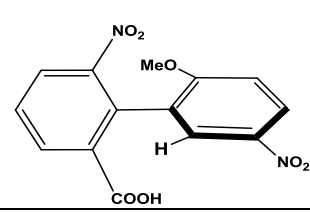
Total Marks: 75

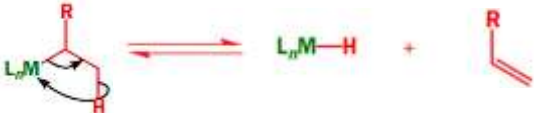
- N.B.:** 1. All questions are compulsory
 2. Figures to right indicate full marks
 3. Draw structures wherever required.

Q. I Attempt all multiple-choice questions (MCQ)

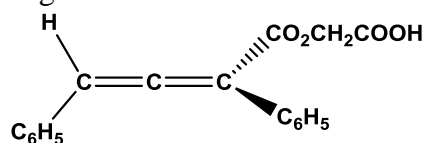
20Marks

Sr. No.	Questions	Options	
1	If enantiomeric yield has been reported as 94%. Calculate the enantiomeric excess	a	6%
		b	12%
		c	88%
		d	94%
2	Hapto number for metal- alkene bond for 1-butene will be	a	1
		b	2
		c	3
		d	4
3	The process of diazotization and hydrolysis of amino acids results in formation of	a	Hydroxy amino acids
		b	Hydroxy amino alcohols
		c	Hydroxy acids
		d	Amino alcohols
4	Reactor with baffles which can be employed to carry out all types of reactions such as solid-liquid, gas-liquid and liquid phase reactions.	a	Continuous stirred tank reactor
		b	Plug flow reactor
		c	Packed bed reactor
		d	Agitator
5	The correct configuration for the below structure will be: 	a	R
		b	S
		c	E
		d	Z

6	Choose the odd one from the Green chemistry principles	a	use of stoichiometric catalyst
		b	short synthesis
		c	safe processes
		d	design products by degradation
7	For heterogenous catalysis process correct sequence of stages are:	a	Absorption, reaction, desorption
		b	Adsorption, reaction, desorption
		c	Reaction, absorption, desorption
		d	Reaction, adsorption, desorption
8	Correct name of the reaction will be: 	a	[2,3]-sigmatropic
		b	[3,3]-sigmatropic
		c	[1,5]-sigmatropic
		d	[1,7]-sigmatropic
9	The correct configuration of the below structure will be: 	a	R
		b	S
		c	D
		d	L
10	To start solution phase peptide synthesis of Leu-Ala-Val-Phe, which amino acid should be considered first?	a	Leu
		b	Ala
		c	Val
		d	Phe

11	Claisen rearrangement is _____	a	[1,5] sigmatropic rearrangement
		b	[1,3]sigmatropic rearrangement
		c	[5,5] sigmatropic rearrangement
		d	[3,3] sigmatropic rearrangement
12	Ultrasound waves with _____ frequency are employed for chemical reactions	a	20-100 Hz
		b	20-100 KHz
		c	20-100 MHz
		d	20-500 MHz
13	1,3-cyclohexadiene on heating at high temperatures will form _____ type of product	a	Cycloaddition
		b	Sigmatropic
		c	Electrocyclic
		d	Diels - Alder
14	Tenta-gel can be called as:	a	Polystyrene-Polyacrylamide composite
		b	Polystyrene- p-divinyl composite
		c	Polystyrene-polyethylene glycol composite
		d	Polystyrene-polpropylene glycol composite
15	If lobes of like sign are on same sides of the molecule, both orbitals must rotate in the opposite direction, one clockwise and other counterclockwise, this kind of motion is	a	Disrotatory
		b	Conrotatory
		c	Suprafacial
		d	Antrafacial
16	The below depicted reaction can be termed as: 	a	Oxidative addition
		b	Reductive elimination
		c	Migratory insertion
		d	Beta-elimination

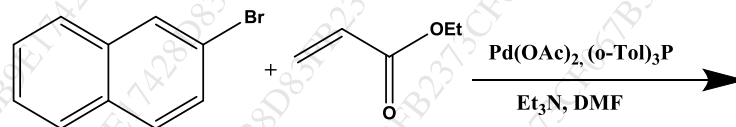
17	Linker which can attach to alcoholic group present in substrate is:	a	Merrifield
		b	Wang
		c	Benzoyloxycarbonyl chloride
		d	Tetrahydropyranyl
18	Photodimerization cannot occur in the following compound:	a	Benzene
		b	Naphthalene
		c	Phenanthrene
		d	Anthracene
19	The structure triphenylphosphine will possess _____ formal charge and donate _____ electrons	a	0, 3
		b	0, 2
		c	-1, 3
		d	-1, 2
20	The correct configuration for the below structure will be:	a	E
		b	Z
		c	R
		d	S



Q. II Attempt any TWO questions

20 Marks

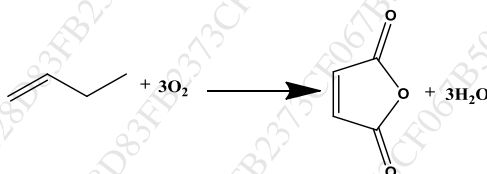
1. a What is the difference between chiral auxiliary and chiral catalyst? Explain with mechanism the use of chiral auxiliary for an asymmetric synthesis. **5 Marks**
1. b Outline all steps with reagents and reaction conditions to synthesize Phe-Ala-Ile-Val tetrapeptide by solid phase synthesis. **5 Marks**
2. a Complete the following reaction. Name the reaction involved and explain its mechanism. **5 Marks**



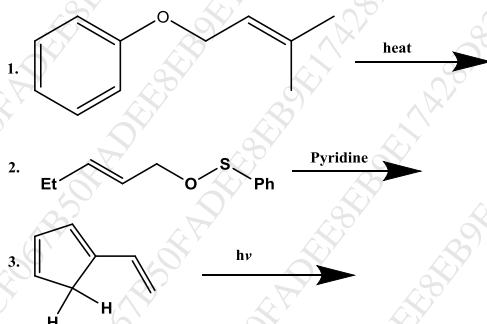
2. b What product would you expect to obtain from the thermal and photochemical cyclization of (2E,4Z,6E)-2,4,6-octatriene? Correct stereochemistry with mechanism and MO diagram is expected. **5 Marks**
3. a Explain the concept of Migratory insertion using carbonylation as an example. **5 Marks**
3. b Explain the mechanism of asymmetric epoxidation using suitable example. **5 Marks**

Q. III Attempt any SEVEN questions**35 Marks**

1. a. Identify the nongreen component of the following reaction, suggest an alternative and state the principle of green chemistry involved: Toluene to p-Methyl acetophenone. 5 Marks
- b. State the principle of green chemistry involved for atom economy and calculate atom economy of the following reaction:



2. Depict mechanism along with suitable examples of any two side reactions initiated by protonation in peptide synthesis. 5 Marks
3. Write structures of product formed with mechanism for the following reactions: Also indicate the name of the reactions: 5 Marks



4. Compare with suitable examples the homogeneous and heterogeneous catalysis. 5 Marks
5. What do you understand by the term chiral pool? State significance of chiral pool strategy. Give one structure each of different types of chiral pools. 5 Marks
6. Suggest in which type of catalyst, poisoning can be observed? Discuss catalyst deactivation. 5 Marks
7. Compare the thermal and photochemical [2+2] cycloaddition reactions. Also draw MO diagrams. 5 Marks
8. Predict whether the structure $\text{Fe}(\text{CO})_5$, $[\text{Fe}(0)]$ fulfills 18 electron rule or not? Fe has 8 valence electrons. Draw structures and indicate haptic numbers for bonding between metal and an allylic anion and cation. 5 Marks
9. Discuss the concept of microwave assisted reactions along with two applications. 5 Marks