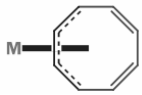
Duration: 3 hours **Total Marks: 75**

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**

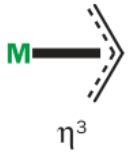
Sr. No.	Questions	Options	
1	Green chemistry principle emphasizing use of innocuous solvents and auxiliaries is	a	3
		b	5
		c	7
		d	9
2	To start solution phase peptide synthesis of Leu-Ala-Val-Phe, which amino acid should be attached first to solid support?	a	Leu
		b	Ala
		c	Val
		d	Phe
3	Which of the following best describes the conrotatory motion in molecular orbitals?	a	Rotation of lobes in opposite directions.
		b	Rotation of lobes in the same direction.
		c	Rotation of lobes in perpendicular directions.
		d	Rotation of lobes in random directions.
4	Identify the correct hapto number for the following. 	a	2
		b	4
		c	6
		d	8
5	The _____diol is produced from degradation of bromobenzene by *Pseudomonas putida.*	a	Cis
		b	Trans
		c	Racemic
		d	meso form

6 Good green option to reduce derivatives can be
- a Covalent derivatization
- b Non-covalent derivatization
- c Protection and deprotection
- d Coupling and decoupling

7 Linker which can attach to amino group present in substrate is:
- a Benzyloxycarbonyl chloride
- b Wang
- c Merrifield
- d Tetrahydropyranyl

8 Photochemical fragmentation of smaller cyclic ketones occurs usually by:
- a Norrish Type II
- b Norrish Type a-II
- c Norrish Type I
- d Norrish Type b-I

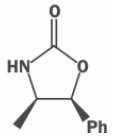
9 Following complex is referred as _____



- a σ allyl
- b π allyl
- c allyl cation
- d allyl anion

10 In Sharpless asymmetric epoxidation, substrate which delivers oxygen to the bottom face of alkene is
- a D (+) diethyl tartrate
- b L (+) diethyl tartrate
- c D (-) diethyl tartrate
- d L (-) diethyl tartrate

11 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 Plug flow reactor
- b Packed bed reactor
- c Agitator

		d	Continuous stirred tank reactor
12	Wang linker is suitable for attachment to _____ functional group of the reactant	a	Alcohol
		b	carboxamide
		c	carboxylic acid
		d	Amine
13	2E, 4Z, 6E-octatriene on heating forms the following product:	a	1Z, 3Z trans 5,6-dimethylcyclohexadiene
		b	1Z, 3Z cis 5,6-dimethylcyclohexadiene
		c	1E, 3E cis 5,6-dimethylcyclohexadiene
		d	1E, 3E trans 5,6-dimethylcyclohexadiene
14	Which of the following is not the method for preparation of solid catalyst	a	Precipitation
		b	Recrystallisation
		c	Hydro-thermal synthesis
		d	Sol-gel synthesis
15	Following chiral auxiliary is derived from _____ 	a	Epinephrine
		b	Norephedrine
		c	Norepinephrine
		d	(S)-valine
16	During side reaction in peptide synthesis; Chain fragmentation can occur in presence of _____	a	Acids
		b	Bases
		c	Coupling agent
		d	Reducing agent
17	Cyclohexanone on irradiation with diazomethane will result in formation of _____ring substituted product	a	cycloheptane
		b	cyclohexane

c cyclopentane

d cyclobutane

18 Which of the following NOT a C-C coupling reaction?

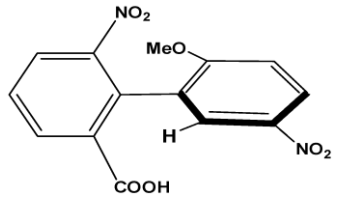
a F.C alkylation

b Heck

c Suzuki

d Shapiro

19 The correct configuration of the below structure will be:



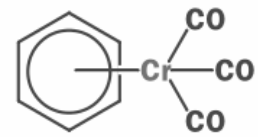
a E

b Z

c R

d S

20 Following complex _____



(Valence electron for Ir=6)

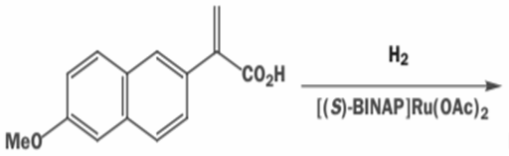
a Satisfies 18 e^- rule

b Does not satisfy 18 e^- rule

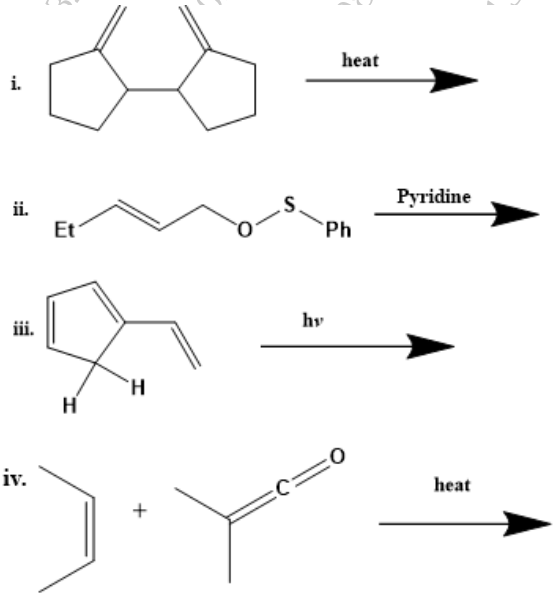
c Satisfies 18 e^- rule and is stable

d Does not satisfy 18 e^- rule and is unstable

Q. II	**Attempt any TWO questions**	**20 Marks**
1. a	Give an account on the different types of supports which can be employed for solid phase peptide synthesis.	4 Marks
1. b	Identify type and product for the following reaction with mechanism	4 Marks

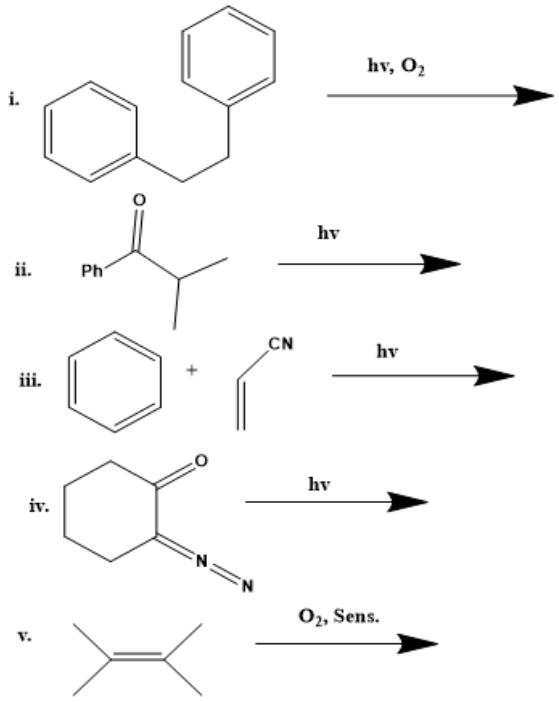


1. c	Give structure of product formed on photochemical cyclization of 2E,4Z,6E, 2,4,6-octatriene. Also show cyclization involves which type of motion.	2 Marks
2. a	Explain in detail catalyst deactivation and poisoning.	4 Marks
2. b	Write structures of product formed with mechanism for the following reactions.	4 Marks



2. c	What do you understand by E-factor? Calculate the theoretical E-factor for a reaction with 90 % atom economy.	2 Marks
3. a	Write a note on biocatalysis.	4 Marks
3. b	Write one structure for different types of chiral pool. Also explain how simple derivatives can be obtained from amino acids.	4 Marks
3. c	Depict with a reaction cyclization side reaction which occurs in Aspartic acid	2 Marks
Q. III	**Attempt any SEVEN questions**	**35 Marks**
1.	What is Sonochemistry? Discuss principle and applications.	5 Marks
2.	Depict all possible side reactions with suitable reactions, which may occur during peptide synthesis due to Overactivation.	5 Marks

3. Write structures of products formed for the following. 5 Marks



4. Explain concept of migratory insertion in catalysis. Depict reaction each for carbometallation and carbonylation. 5 Marks

5. Compare conventional and enantioselective Diel's alder reaction. 5 Marks

6. What do you understand by the term: Homogeneous catalysis. Write the product obtained when 1-butene undergoes homogeneous hydrogenation reaction. Write the name and structure of the catalyst used for this reaction. 5 Marks

7. Outline all steps with reagents, reaction conditions and mechanism for Solid phase synthesis of tetrapeptide Phe-Val-Leu-Lys 5 Marks

8. Complete the following table 5 Marks

Method	Advantages	Disadvantages	Example
Chiral catalyst			
Chiral auxiliary			

9. a 3 Marks

Enlist the Green Chemistry Principles. Write reaction and identify the non-green component in the following reaction. Suggest alternatives for the non-green component.

Nitrobenzene to m-dinitrobenzene

9. b Exemplify with a reaction 1,3-dipolar cycloaddition reaction 2 Marks