

[Time: 3 Hours]

[Total Marks: 100]

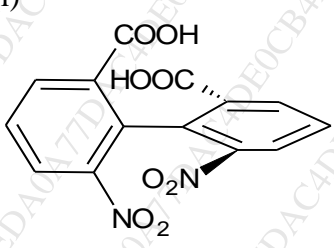
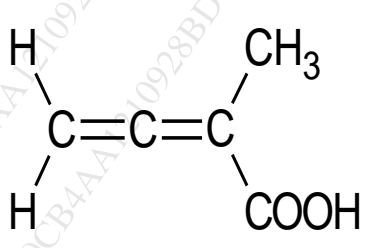
**Please check whether you have got the right question paper.**

- N.B.**
1. All Questions are compulsory.
  2. Figures to the right indicate full marks.
  3. The use of log-table/non-programmable calculator is allowed.
  4. Answers for the same question as far as possible should be written together.

**Q.1****Answer any four of the following:**

- A** Explain the following with suitable examples: **5**
1. Neighbouring Group Participation
  2. Electrocyclic reaction
  3. Electrophile
- B** Distinguish between **3**
- i) Nucleophilicity and Basicity **3**
  - ii) Reaction Intermediates and Transition state **2**
- C** What are pericyclic reactions? Explain pyrolytic elimination of Xanthate esters and Acetates with suitable examples. **5**
- D** Write a reaction for the esterification of acetic acid and explain its mechanism. **5**
- E** Distinguish between Singlet and Triplet States. What are forbidden transitions? **5**
- F** Write reactions to explain Norrish Type I cleavage of acetone at room temperature. **5**

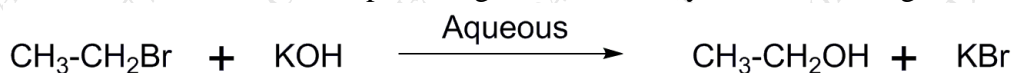
**Q.2****Answer ANY FOUR of the following:**

- A** Write a note on the following- **3**
- a) Alternating axis of symmetry **3**
  - b) Centre of symmetry **2**
- B** a) Identify optically active and optically inactive molecules among the following, justify your answers- **3**
- (i) 
  - (ii) 
- b) Write the structure of meso-tartaric acid and identify the element of symmetry present in it. **2**
- C** a) Write a note on biopesticides. **3**
- b) Give synthesis of Endosulfan **2**

- D** a) Give advantages and disadvantages of Agrochemicals. **3**  
 b) Discuss the action of mixture of fuming  $\text{HNO}_3$  and concentrated  $\text{H}_2\text{SO}_4$  on isoquinoline at  $0^\circ\text{C}$ . **2**
- E** Write Bischler- Napieralski synthesis for 1-methyl isoquinoline. **5**
- F** a) Explain: Pyridine-N-oxide gives electrophilic substitutions and nucleophilic substitutions at the same positions. **3**  
 b) Write the reaction of following reagents with quinoline. **2**  
 (i) alkaline  $\text{KMnO}_4$ , (ii) peracetic acid

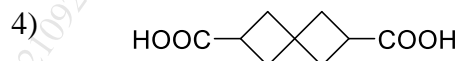
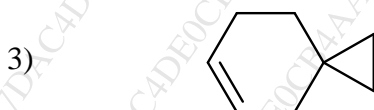
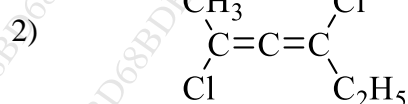
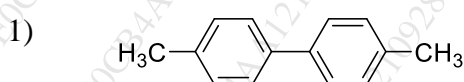
**Q.3 Answer any four of the following:**

- A** a) Explain Linear synthesis with a suitable example. **3**  
 b) State any four principles of Green chemistry. **2**
- B** a) Give any two examples of a Chemoselective reaction. **3**  
 b) Give any one use of dimethyl carbonate as a methylating agent in green chemistry. **2**
- C** Define E-factor? Calculate the percentage atom economy of the following reaction. **5**



Atomic Weight: C = 12, H = 1, O = 16, Br = 80, K = 39

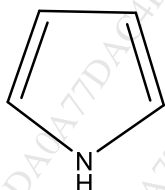
- D** Give the synthesis of the following compounds: **5**  
 1) p-bromobenzoic acid from p-aminobenzoic acid  
 2) 3-methyl-1-butanol using a suitable Grignard reagent
- E** Write the structural formula for each of the following compounds: **5**  
 1. 3-Iodo spiro [4.5] decane  
 2. Bicyclo [3.3.0] octane  
 3. Bicyclo [2.2.1] heptan-2-one  
 4. 2-Ethoxy quinoline  
 5. Penta-2,3-diene-1-oic acid
- F** Give IUPAC names for each of the following compounds: **5**



**Q.4 Answer any four of the following:**





- A** a) Define the following terms used in UV-Visible spectroscopy **3**  
 i) Chromophore  
 ii) Auxochrome  
 iii) Red shift  
 b) Explain the effect of solvent on  $\lambda_{\text{max}}$  with a suitable example. **2**

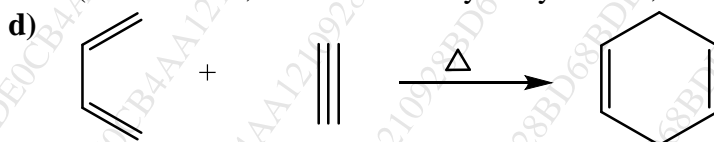
- B** a) Explain the mass spectral fragmentation pattern of 2- Methyl but-2-ene. **3**  
 b) Give the basic principle of mass spectroscopy. **2**  
**C** a) Give the synthesis of adrenaline from catechol. **3**  
 b) Define hormones. Give any two functions of adrenaline. **2**  
**D** a) What are terpenoids? Give analytical evidence to prove that Citral is an unsaturated terpenoid. **3**  
 b) Give analytical evidence to prove that Nicotine has a pyridine ring with a side chain containing  $>\text{N}-\text{CH}_3$  group. **2**  
**E** a) Give the synthesis of citral from 6- methyl hept-5-en-2-one. **3**  
 b) State and explain Special isoprene rule as applied to Citral. **2**  
**F** a) Give the reaction for Hofmann exhaustive methylation and degradation of : **3**



- b) What are the harmful effects of nicotine? **2**

**Q5 A Fill in the blanks with the most correct given alternative. Rewrite the completed statements. (Any five)** **5**

- a) To show the movement of a pair of electrons ..... is used.  
 (  ,  ,  ,  )  
 b) The term ..... is associated with NGP?  
 (saponification; pericyclic reaction; anchimeric assistance; cycloaddition)  
 c) The products of Cope elimination are alkene and .....  
 (amine oxide; substituted hydroxyl amine; tertiary amine; amide )



The above reaction is ..... reaction.

- ( Diel's Alder; Saponification; Claisen; Chugaev)  
 e) Group transfer reactions are most closely related to ..... reactions.  
 (Electrocyclic; Cheletropic; Cycloaddition; Sigmatropic)  
 f) The wavelength of phosphorescence is ..... than fluorescence and has ..... energy.  
 (longer, more; longer, lesser; shorter, more; shorter, lesser)  
 g) Di- $\pi$  -methane reaction is an example of photochemical.....  
 (reduction; rearrangement; isomerization; elimination)  
 h) In photosensitization the energy of the excited state Donor molecule should be ..... the excited state of Acceptor molecule.  
 (more than; less than; approximately equal to; identical to)

**B State whether following are True or False- (ANY FIVE)** **5**

- a) Always an optically active compound must contain at least one chiral carbon atom.  
 b) In an allene compound, the central carbon atom is  $\text{sp}$  hybridized.  
 c) Indole-3-acetic acid is a plant hormone from auxin class.

- d) Fungicides are the chemicals that destroy, prevent or inhibit the growth of weeds.
- e) Oxidation of pyridine using peracid gives pyridine-N-oxide.
- f) Electrophilic substitution reactions on quinoline take place preferably at positions 5 and 8.
- g) Isoquinoline is also known as 1-azanaphthalene.

**C Fill in the blanks (Any five)**

**5**

- a) In the nomenclature of spirans, the ----- ring is not given the preference.
- b) To name the fused and bridged ring systems the numbering starts from the ----- carbon atom.
- c) Quinolines belongs to the class of condensed ----- compounds.
- d) ----- is the term used when the reactions are carried out by using Ultra sound.
- e) Benadryl is prepared by ----- synthesis.
- f) Alkyl lithium reacts with alkyl halides to form higher -----.
- g) The concept of atom economy was developed by -----.
- h) ----- is an example of a green solvent used in industry for recycling of waste.

**Q 5 D Match the following columns ( Attempt any five)**

**5**

<b>a</b>	Adrenaline	<b>1</b>	Odd mass number
<b>b</b>	Lemon grass oil	<b>2</b>	Quinoline alkaloid
<b>c</b>	Amino acid derivative	<b>3</b>	Epinephrine
<b>d</b>	Quinine	<b>4</b>	Citral
<b>e</b>	Odd number of nitrogen atom	<b>5</b>	Thyroid hormones
<b>f</b>	$n$ to $\pi^*$	<b>6</b>	Tobacco leaves
<b>g</b>	Nicotine	<b>7</b>	$>C=O$ group
		<b>8</b>	Phenanthrene alkaloid

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