This question paper contains 4+1 printed pages]

Roll No. ☐☐☐☐☐☐☐☐☐☐☐

S. No. of Question Paper : **6979**

Unique Paper Code : **217682**                                        **D**

Name of the Paper : **Green Chemistry (EL310 (i)]**

Name of the Course : **B.Sc. (Applied Physical Science/Analytical Chemistry/Industrial Chemistry/Mathematical Science)**

Semester : **VI**

Duration : **3 Hours**                                        Maximum Marks : **75**

*(Write your Roll No. on the top immediately on receipt of this question paper.)*

Attempt *Six* questions in all. Question No. **1** is compulsory and carries **15** marks.

*All* other questions are of **12** marks each.

1.  (*a*)  Fill in the blanks with appropriate word(s) :                     7×1=7

    (*i*)  Atom economy involves the maximum conversion of reactants to.................. .

    (*ii*)  Ionic liquids are...........................solvents.

    (*iii*)  Geen reactions violate the use of..................................reagents/solvents.

(iv) Chlorofluoro carbons cause.............................of ozone layer.

(v) Enzymes are known as....................................Catalysts.

(vi) DMC stands for......................... .

(vii) Green chemistry is governed by.................................................... .

(b) Define the following terms :                    4×2=8

(i) Green solvents

(ii) Sustainable development

(iii) Green chemistry in pharmaceutical industry

(iv) Saponification.

2. Give the green synthesis of any *three* :                    3×4=12
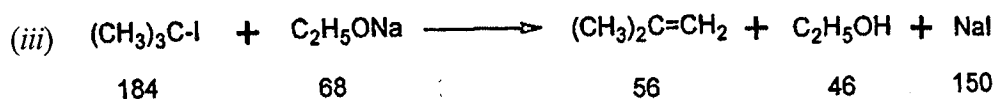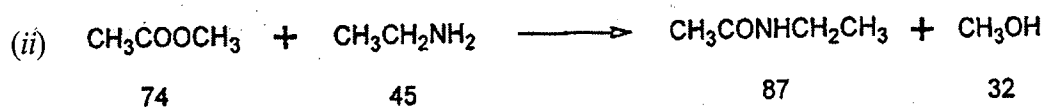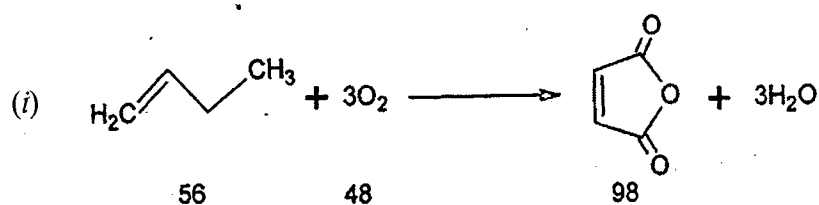
(a) Catechol

(b) Methyl methacrylate

(c) Benzyl bromide

(d) Disodium iminodiacetate.

3. Write short notes on any *three* :                              3×4=12

    (*a*) Role of green chemistry in polymer industry

    (*b*) Atom economy

    (*c*) Hazardous solvents

    (*d*) Combinatorial green chemistry.

4. (*a*) Write down the **twelve** principles of green chemistry. Explain any *two* principles with the help of examples.                              6

    (*b*) Define ionic liquids.                              2

    (*c*) Discuss the advantages of water as solvent over the organic solvents.      4

5. Discuss any *four* reactions under sonication taking a suitable example :      4×3=12

    (*i*) Strecker synthesis

    (*ii*) Oxidation reactions

    (*iii*) Reduction reactions

(iv)  Cannizzaro reaction

(v)  Alkylation reactions.

6.  (a)  Calculate the % atom economy for the following chemical reactions :  3×2=6

(i)  

$H_2C$ ...CH_3 + 3O_2 ⟶ [anhydride] + 3H_2O

56          48                    98

(ii)  $CH_3COOCH_3$ + $CH_3CH_2NH_2$ ⟶ $CH_3CONHCH_2CH_3$ + $CH_3OH$

74              45                          87              32

(iii)  $(CH_3)_3C$-I + $C_2H_5ONa$ ⟶ $(CH_3)_2C=CH_2$ + $C_2H_5OH$ + NaI

184          68                      56              46          150

(b)  Discuss the use of diphenylcarbonate in solid state polymerization of amorphous

polymers.                                                                    4

(c)  How to prevent chemical accidents in the laboratory ? Explain.            2

7.  (a)  Explain the following reactions when induced by microwaves :        4×2=8

(i)  Hofmann elimination in water

(*ii*) Diels-Alder reaction in organic solvent

(*iii*) Oxidation of toluene in water

(*iv*) Solid state deacetylation.

(*b*) Catalytic reagents are superior to stoichiometric reagents. Justify with suitable

4

examples.

8. (*a*) Describe the role of "Clayan" as a non-metallic oxidative reagents in various

6

reactions.

6

(*b*) Discuss the future aspects of green chemistry in various areas.