U.G. 6th Semester Examination - 2020

CHEMISTRY

Course Code : BCEMDSHC5

Course Title : Green Chemistry

Full Marks : 30 Time : 2 Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer any **ten** questions: 1×10=10

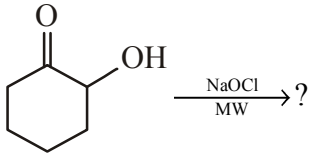
a) Define antifoulant.

b) Which catalyst was used for synthesis of cocoa-butter-equivalent from palm oil?

c) Which chemical was responsible for Flixborough accident?

d) What is full form of 'MORE'?

e) Complete the following reactions:



f) What is the chemical name of catalyst 'Magtrieve-I'?

g) Write any two principles of green chemistry.

h) 'Magnetron' consists of a solid metal rod acts as _____ and a ring-shaped _____.

i) Write one medical application of iminodiacetic acid (IDA).

j) What is the frequency range of sonic waves?

k) Why oxidation of cyclohexanone or cyclohexanol to adipic acid (by conventional method) is not considered as green synthesis (give one reason)?

l) Give the formula of red colour inorganic pigments.

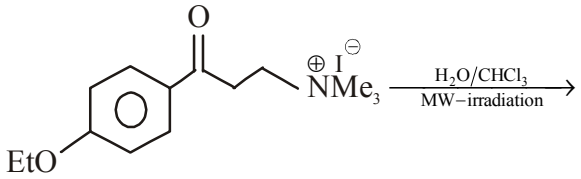
m) In cradle to cradle caspeting PVC has been replaced by what materials?

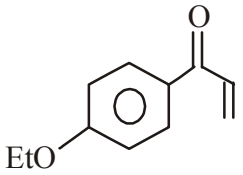
n) Addition of LiCl in a reaction mixture of Diels-Alder reaction in water increases the rate whereas addition of guanidinium chloride decreases the rate– explain why?

o) What catalyst is used for polymerisation of lactic acid for the preparation of PLA?

2. Answer any **five** questions: 2×5=10

a) Consider the following reaction:





(good yield)

Explain the role of solvents in this reaction.

b) Calculate the atom-economy for the following reaction:

$$HOCH_2CHOHCH_2OH + H_2 \xrightarrow[200^oC,\ 200psi]{CuCrO_4} CH_3CHOHCH_2OH$$

c) What are the utility of polyethylene glycol as solvent?

d) What is the active ingredient in Sea-Nine (R) 2IL?

e) Why Ionic liquids (IL) considered as immobilizing agent?

f) Describe sonochemical Simons-Smith reaction with giving an example.

g) Explain 'In-water' and 'On water' reaction.

h) What is the safer route to formation / synthesis of carbaryl which bypasses the use of toxic MIC gas?

3. Answer any **two** questions: 5×2=10

a) i) How D-glucose can be converted to adipic acid using microbial catalyst? Give reaction scheme. 3

ii) Give an example of MW assisted decarboxylation reaction. 2

b) i) What are the detrimental effect of tributyltin oxide (TBTO) used as antifoulant to environment? How are these overcome by using green antifoulant? 3

ii) Give an example of chemical reaction carried out in ionic liquids (IL). 2

c) i) Define supercritical fluids. Give one example of reaction carried out in $ScCO_2$. 3

ii) Give an example of MW assisted deprotection of silyl group where fluoride ion is not used. 2

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