MANIPAL
ACADEMY of HIGHER EDUCATION
(Deemed to be University under Section 3 of the UGC Act, 1956)

Reg. No.										

DEPARTMENT OF SCIENCES, III SEMESTER M. Sc. (CHEMISTRY)
END SEMESTER EXAMINATIONS, NOVEMBER 2018

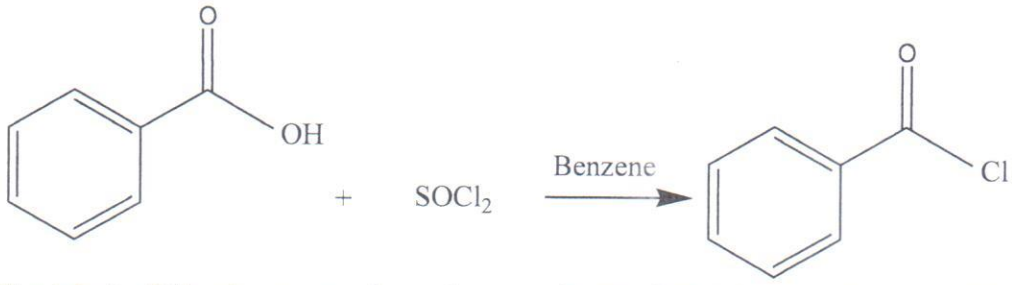
GREEN CHEMISTRY [CHM - 5006]
(REVISED CREDIT SYSTEM-2017)

(Regular)

Time: 3 Hours Date: 24th Nov 2018 MAX. MARKS: 50

Note: (i) Answer **ALL** questions
(ii) Draw diagrams, and write equations wherever necessary

1.A. Calculate the E-factor, atom efficiency, effective mass yield, reaction mass efficiency and carbon efficiency for the following chemical process. The yield of the product obtained is 76 %.



1.B. Explain the following green solvent, increase the reaction yield. In each case explain any two reactions
(i) Crown ether (ii) Ionic liquid

1.C. Define bioavailability. Explain how to reduce the bioavailability.

(5 + 3 + 2)

2.A. (i) Discuss with an example, the severity and potency of a toxic chemical.
(ii) What are the disadvantages of reducing risk through minimizing exposure?

2.B. Explain how Supercritical CO_2 act as alternative for dry cleaning reagent?

2.C. Write briefly about REACH and CLP in India.

(5 + 3 + 2)

3.A. Discuss the various methods of green synthesis of nanomaterials.

3.B. Explain the advantages of electrochemical synthesis over organic synthesis and write the reaction involved in the electrochemical synthesis of sebasic acid.

3.C. What are the advantages of polystyrene based support materials for heterogenisation of homogeneous catalysts?

(5 + 3 + 2)

4.A. Explain the green and conventional methods of preparation of the following chemicals with justification by their Eco factor values.
(i) Vanillin (ii) Citral

4.B. Explain in detail the process of Environmental management system

4.C. Define and give an example each for chemo, regio, enantio and shape selectivities.

(5 + 3 + 2)

5.A. Explain the green methods of production of the following from biomass.
(a) Isoprene (b) Glycerin (c) lactic acid
(d) Succinic acid (e) 1,3-butadiene

5.B. How is life cycle assessment helpful to reduce the waste in environment? Explain your answer with one example.

5.C. Explain the importance of selectivity in catalysis for sustainable development.

(5 + 3 + 2)

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