Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME- SEMESTER II– EXAMINATION – SUMMER 2015

Subject Code: 2721610 **Date:03/06/ 2015**

Subject Name: Cleaner Production in Chemical Industries

Time: 2:30 PM – 5:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q-(1) One of the Principles of Cleaner Production is ï ñOptimization of various process parameters in a manufacturing processò. Elaborate this statement with suitable relevant critical discussion for the production of Vinyl Acetate using raw materials ï ethylene, oxygen and catalyst $PdCl_2$ + $Cucl_2$ solution. Explain with the help of Reaction Mechanism how optimum concentration of catalyst only will lead to Cleaner Production ï otherwise not. **(14)**

Q-(2) **(a)** In a plant manufacturing Formaldehyde (HCHO), how the principles of Cleaner Production can be implemented via Concept of Energy Conservation? **(07)**

(b) Discuss the Environmentally friendly process for the production of Acrylonitrile using concept of three ï ñRò ï Recycle, Reuse and Reduce. **(07)**

OR

(b) How cleaner production can be achieved in a plant manufacturing ï Dodecyl Benzene Sulphonate (DBS) by use of Special type of reactor ï Rotating Disc Contactor (RDC)? **(07)**

Q-(3) How Cleaner Production can be achieved by use of ñThermodynamics and Reaction Engineering Principlesò in a Plant Producing ï monomer ñStyreneò? Illustrate your answer with the help of suitable data, diagrams and equations. **(14)**

OR

Q-(3) How Cleaner Production can be achieved by use of ñThermodynamics and Reaction Engineering Principlesò in a Plant Producing ï monomer ñVinyl Chlorideò? Illustrate your answer with the help of suitable data, diagrams and equations. **(14)**

Q-(4) **(a)** There is good scope to implement Cleaner Production Principles in a plant manufacturing ñH-Acidò. Elaborate with appropriate discussion. **(07)**

OR

(a) There is good scope to implement Cleaner Production Principles in a plant manufacturing ñParacetomolò. Elaborate with appropriate discussion. **(07)**

(b) Enlist the twelve basic principles for Green Chemistry. **(07)**

OR

(b) Explain óGreen Designô and its objectives in detail. **(07)**

Q-(5) **(a)** Explain the concept of Good Housekeeping as applicable to Cleaner Production and enlist the various benefits of good housekeeping. **(07)**

OR

(a) Enlist the various steps involved in CP Methodology. **(07)**

(b) What is CPA? Explain the tasks that are incorporated in the analysis of process steps for CPA. **(07)**

OR

(b) Define Cleaner Production. Explain the role of CP in sustainable development of Chemical Industries **(07)**

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