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SARDAR PATEL UNIVERSITY

M.Sc SEMESTER EXAM, SEM-IV

INDUSTRIAL CHEMISTRY

PS04CICH11 PROCESS DEVELOPMENT IN CHEMICAL INDUSTRIES

TIME: 2:00 to 5:00 p.m.

12-04-2018

MARKS: 70

Q.1 ANSWER THE FOLLOWING MCQs

(08)

- _____ is a basic objective which never lost sight of in Process Development
A. Economy B. Reproducibility C. Resource Efficiency D. Operational Simplicity
- Production of _____ is the aim of Chiral Technology
A. Racemate B. Enantiomers C. Single enantiomer D. Isomers
- The Alkylation reaction is carried out by using Sulphuric acid and _____ as a catalyst.
A. NH₃ B. RMgX C. HF D. HCN
- _____ is a commonly used support for a reagent
A. Silica B. Alumina C. Both A & B D. None of these
- CHETAH predicts _____ of a chemical reaction
A. Heat of reaction B. Heat of formation C. Heat of decomposition D. Heat of neutralization
- Solvation of transition state decreases the _____ of chemical reaction
A. Internal energy B. Activation energy C. Potential energy D. Kinetic energy
- Commercial solvents permit reaction temperatures of _____
A. - 100 to 250 B. - 250 to 100 C. -50 to 300 D. - 100 to 100
- The main aim of work-up is to _____ most of the product in a reasonably pure state.
A. Isolate B. Wash C. Filter D. Distill

Q.2 Answer the following short questions (Any 7)

(14)

- What is process research and development?
- Give Reichardt's definition of polarity
- What is atom efficiency?
- What is Telescoping of a process?

5. Define the terms Achiral and Prochiral?
6. What is a reagent?
7. What is the significance of supporting a reagent?
8. Explain the term like dissolves like with respect to solvents.
9. Enlist various physical methods of purification?

Q.3 (a) Discuss the following objectives of process development: (06)

- i. Cost effectiveness and Yield
- ii. Resource Efficiency
- iii. Environment Friendliness

Q.3 (b) Explain the evolution of Process R & D into a process technology. (06)

OR

Q.3 (b) Discuss an investigative approach to optimization in brief. (06)

Q. 4 (a) Present a survey of Ammination reaction in relation to process development (06)

Q.4 (b) Present a brief discussion on Chiral technology (06)

OR

Q.4 (b) Present a brief discussion on Process Simplification (06)

Q.5 (a) Discuss the various needs for reagent modification and enlist various ways by which the reagent reactivity can be improved to obtain the best performance. (06)

Q.5 (b) Write a note on Safety assessment techniques in detail. (06)

OR

Q. 5(b) Which are the possible roles of solvents in a chemical reaction? Present a broad classification of polar and non-polar solvents. (06)

Q. 6(a) What is Work-up for a chemical process? Explain its significance in any chemical process. (06)

Q.6 (b) Discuss in brief Aqueous and Non-aqueous Work-ups. (06)

OR

Q.6 (b) Write a note on purification and also discuss crystallization operation as a tool for purification (06)

_____ X _____