

C 61874

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Name.....

Reg. No.....

**FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, JUNE 2019**

(CUCSS-PG)

Chemistry

CH 4E 05—INDUSTRIAL CATALYSIS

(2015 Admissions)

Time : Three Hours

Maximum : 36 Weightage

**Section A**

*Answer all questions.*

*Each question carries a weightage of 1.*

1. Define isosteric heat of adsorption.
2. Distinguish between associative and dissociative type of chemisorption.
3. Unimolecular surface catalysed gas phase reactions follow first order kinetics at low pressures and zero order kinetics at high pressures. Why ?
4. Transition metals in general are used as hydrogenation catalysts. Why ?
5. Explain, with example 'shape selective catalysis'.
6. Distinguish between Zeolite X and Y.
7. Explain the term 'catalyst poisoning'.
8. What is the use of PEG in phase transfer catalysis ?
9. Explain the term 'specificity' with respect to enzyme catalysis.
10. How would you express catalytic power of an enzyme.
11. Explain with example metallocene.
12. Name two environmental catalysts. Justify your answer.

(12 × 1 = 12 weightage)

**Section B**

*Answer any eight questions.*

*Each question carries a weightage of 2.*

13. Briefly explain capillary condensation.
14. With the help of potential energy surface distinguish between activated and non-activated adsorption.
15. How does diffusion influence reaction inside the pores ? Discuss.
16. Define porosity. How is it measured ?

**Turn over**

17. Briefly discuss structure of zeolites.
18. Discuss electronic factors in catalysis by metals.
19. What are the methods of estimating surface acidity of a solid ? Discuss.
20. What are the methods of regeneration of a catalyst ?
21. Discuss the importance of quarternary ammonium salts in phase transfer catalysis.
22. Briefly discuss mechanism of enzyme action.
23. Discuss catalytic conversion of methanol to acetic acid.
24. What are the mechanisms of deactivation of a catalyst ? Discuss.

(8 × 2 = 16 weightage)

### Section C

*Answer any two questions.*

*Each question carries a weightage of 4.*

25. Derive BET adsorption isotherm. How is it made use of in surface area determination ? Discuss.
26. Briefly discuss basic concepts of phase transfer catalysis.
27. With the help of suitable examples discuss catalytic cracking.
28. Discuss briefly mobil process for conversion of methanol to gasoline.

(2 × 4 = 8 weightage)