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**II Semester M.Sc. Degree Examination, May/June 2019**

(CBCS)

**INDUSTRIAL CHEMISTRY**

**Chemical Engineering Technology**

Time : 3 Hours]

[Max. Marks : 70

**Instructions :**

1. Answer Part A and any five questions from Part B.
2. Figures to the right indicate marks.

PART - A

1. Answer **any five** questions : (5 × 2 = 10)
  - (a) Define Henry's Law.
  - (b) Mention the uses of evaporation technique in industry.
  - (c) What are crystallizers? Mention their types.
  - (d) Write the criteria for gas absorption.
  - (e) What are nitrating agents? Mention their importance.
  - (f) Comment on industrial alkylation process. Give two methods for preparation of sulfonating agents.
  - (g) Distinguish between hydrogenation and hydrogenolysis.
  - (h) Write major advantage of gas phase oxidations process.

PART - B

- Answer **any five** questions : (5 × 12 = 60)
2.
    - (a) Explain the forced circulation and multiple effect evaporators.
    - (b) Discuss about fractional distillation and its significance.
    - (c) State and explain the Rault's law and its significance. (5 + 4 + 3)
  3.
    - (a) Discuss the boiling and distillation process.
    - (b) Explain the basic principle of steam distillation with the help of a neat diagram.
    - (c) Write a brief note on azeotropic mixtures with examples. (5 + 4 + 3)

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4. (a) Write a note on principle of flow chemistry and its applications.  
(b) Give an account of continuous vacuum crystallizers.  
(c) Explain the working of Krystal crystallizer and its applications. (5 + 4 + 3)
5. (a) Discuss the working principle of agitated tank crystallizer.  
(b) Give an account of nucleation theory of crystallization with diagrams.  
(c) Draw a comparison of absorption and distillation. (5 + 4 + 3)
6. (a) Discuss the kinetics and mechanism of sulfonation with suitable examples.  
(b) Explain the nitration of paraffinic hydrocarbons.  
(c) Write the manufacturing process for turkey red oil. (5 + 4 + 3)
7. (a) Describe the Friedel-Craft alkylation at oxygen and nitrogen with suitable examples.  
(b) Give the manufacturing process for detergents.  
(c) Explain the alkylation reaction for ethylacetoacetate. (5 + 4 + 3)
8. (a) Elaborate on the industrial hydrogenation processes with suitable examples.  
(b) With the help of neat diagram discuss industrial manufacturing process of cellulose acetate.  
(c) Briefly explain the manufacturing of vinyl chloride. (5 + 4 + 3)
9. (a) List out the different types of oxidizing agents and explain liquid phase oxidation reaction with an example.  
(b) Write the kinetics and mechanism for the esterification of nitroglycerin.  
(c) Give an account on esterification of carboxylic acids with suitable mechanism. (5 + 4 + 3)
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