

University of Mumbai
Examination 2020 under cluster __ (Lead College: PCE _____)
Examination Summer (May/June) 2022

Program: **Chemical Engineering**
Examination starting from May 2022
Curriculum Scheme: Rev 2019
Examination: SE Semester IV

Course Code: CHC40322 and Course Name: Industrial & Engineering Chemistry-II
Time: 2 hour-30 min Max. Marks: 80

S.E.(Chemical)(Choice Base) (R-2020-21 'C' Scheme) Semester - IV / 40322 - Industrial & Engineering Chemistry II

DATE: 20/5/2022 QP CODE: 93337

All the Questions are compulsory and carry equal marks.

Q1.	The movement of dispersed phase in colloids is observed in ---
Option A:	Sedimentation potential
Option B:	Electroosmosis
Option C:	Streaming potential
Option D:	Electrolysis
Q2.	On autoionization of liq. NH ₃ which of the following species are generated?
Option A:	Ammonium ion and Ammonia gas
Option B:	Hydrogen ion and Amide ion
Option C:	Ammonium ion and Amide ion
Option D:	Only Ammonium ion
Q3.	Pyridine is strongly alkaline in nature because _____
Option A:	It has delocalised pi electron cloud
Option B:	It has six membered ring with nitrogen atom
Option C:	Lone pair of nitrogen is involved in conjugated system
Option D:	Lone pair of nitrogen is not a part of conjugated system
Q4.	Example of "Oil is dispersed phase and water is dispersion medium" is
Option A:	Gel
Option B:	Vanishing cream
Option C:	Butter
Option D:	Cheese spread
Q5.	The temperature of the sample is compared with that of reference material as both are heated at uniform rate.
Option A:	TGA
Option B:	DTA
Option C:	DSC
Option D:	TSC
Q6.	Which of the following is used as a catalyst for the following reaction?

	$N_2 + 3H_2 \rightarrow 2NH_3$
Option A:	Zinc
Option B:	Iron
Option C:	Chlorine
Option D:	Water
Q7.	In preparation of unsaturated carboxylic acid from malonic ester which of the following compounds is used?
Option A:	A carbonyl compound
Option B:	A halogen ester
Option C:	Urea
Option D:	A dihaloalkane
Q8.	The example of homogeneous catalysis is ----
Option A:	Formation of methanol from (CO +H ₂) gases, with ZnO catalyst.
Option B:	Acid - base catalysis
Option C:	Formation of H ₂ & CO ₂ from formic acid in presence of Cu foil.
Option D:	Formation of ammonia over powdered Fe catalyst.
Q9.	The most abundant fragment give rise to ----- peak on mass spectrum.
Option A:	Base
Option B:	Molecular ion
Option C:	Least fragmented
Option D:	Non fragmented
Q10.	--- does not give any information about sigma bonds.
Option A:	u.v. spectroscopy
Option B:	IR spectroscopy
Option C:	NMR spectroscopy
Option D:	Spectrophotometry

Q2 (20 Marks)	Solve any Four out of Six (5 Marks each)
A	Give the application of colloids in Surfactants.
B	Write about how activation energy changes in a chemical reaction using a catalyst? Write in brief Adsorption theory of catalysis
C	Explain Chemical shift involved in NMR spectroscopy. How many NMR signals are there in 1)C ₆ H ₅ -CH ₃ 2) CH ₂ Cl-CHCl ₂ 3) C ₆ H ₅ -CH ₂ -CH ₃ ?
D	Give the principle & describe any 3 important applications of Thin Layer chromatography.
E	Explain Dipole moment & Dielectric constants of ionising solvents.

F	Describe Beckmann rearrangement with its mechanism & application.
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Q3 (20 Marks)	Solve any Four out of Six (5 marks each)
A	Write in detail the concept of Electrical double layer using Helmholtz and Stern Model.
B	Describe Gas chromatography (Principle & 2 Applications).
C	Explain any 5 characteristics of catalysts.
D	Compare between uv&IR spectroscopy.
E	What is importance of non aqueous solvents? Give Acid-base & Redox reactions in Liq SO ₂ .
F	Write in detail about the aromaticity of Naphthalene.

Q4 (20 Marks)	Solve any Four out of Six (5 marks each)
A	What is meant by thermal analysis? How is it used to check purity of compound?
B	Write a short note on Electroosmosis.
C	Give the preparation of ethylacetoacetate with mechanism.
D	Give principle & describe any 2 applications of HPLC.
E	Write a note on leveling effect of solvents.
F	How do you get α hydroxy acids from α -diketones?