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BTECH
(SEM I) THEORY EXAMINATION 2021-22
ENGINEERING CHEMISTRY

Time: 3 Hours**Total Marks: 70****Note: 1. Attempt all Sections. If require any missing data; then choose suitably.****SECTION A****1. Attempt all questions in brief. 2 x 7 = 14**

a.	Illustrate any two applications of Nanotechnology.
b.	Define Metal excess defect with example.
c.	Justify simple molecule do not polymerized?
d.	What is chemical Formula of Plaster of Paris?
e.	What are Auxochrome? Give example.
f.	Why hardness is expressed in terms of CaCO ₃ equivalents.
g.	How many NMR Signal is Obtained in CH ₃ COCH ₂ CH ₃ ?

SECTION B**2. Attempt any three of the following: 7 x 3 = 21**

a.	Draw the Molecular Orbital diagram of N ₂ molecule. Calculate its bond order and predict their magnetic behavior.
b.	Illustrate the preparation of Organometallic compounds with their applications.
c.	Explain setting and hardening of cement with relevant chemical reactions involved.
d.	Illustrate Ion exchange process for the purification of hard water?
e.	Discuss the electronic transition and shifts in UV –Visible Spectroscopy.

SECTION C**3. Attempt any one part of the following: 7 x 1 = 7**

a.	Discuss stoichiometric and non-stoichiometric defects? Explain Frenkel and Schottky defects found in solids.
b.	Illustrate the concept of Liquid crystals? Classify them on the basis of temperature and mention four important applications of it.

4. Attempt any one part of the following: 7 x 1 = 7

a.	Give the preparation, properties and applications of the Nylon 6,6 and Buna – S.
b.	Illustrate the conducting polymers with its classification and application.

5. Attempt any one part of the following: 7 x 1 = 7

a.	Discuss the electrochemical theory of corrosion. How it can be prevented.
b.	Derive Nernst equation and give its applications.

6. Attempt any one part of the following: 7 x 1 = 7

a.	Calculate the quantity of lime (85% pure) and soda (90% pure) for softening 100000 liters of water. Water sample containing following salts on analysis: CaCl ₂ = 111 mg, MgSO ₄ = 30 mg, Mg (HCO ₃) ₂ = 36.5 mg. and FeSO ₄ .7H ₂ O = 73 mg.
b.	Illustrate the salient features of the phase diagram of Water system highlighting the name of system (areas, curves and points), phase in equilibrium and degree of freedom in each case.

7. Attempt any one part of the following: 7 x 1 = 7

a.	Illustrate with the help of a neat diagram, how calorific value is determined by bomb calorimeter.
b.	Outline finger print region and the different types of molecular vibrations in IR spectroscopy.