

TCY-101

1266

Printed Pages : 4

Paper Code & Roll No. to be filled in your Answer Book

Roll No.

--	--	--	--	--	--	--	--	--	--

B. Tech. I Year I Sem.

Odd Semester Examination-2015

ENGINEERING CHEMISTRY*Time : 3 Hrs.]**[Max. Marks :100***Answer Any Four (4x5=20)**

1. Write the postulates of Molecular orbital theory. With the help of Molecular orbital diagram show nitrogen is diamagnetic and Oxygen is paramagnetic.
2. Give the mechanism of following organic reactions-
 - i) pinacol-pinacolone rearrangement
 - ii) Hoffmann's rearrangement
3. State Bragg's diffraction law ?
At what glancing angle would the first order diffraction occur, when copper radiation ($\lambda = 154 \text{ pm}$) interact with lattice planes that are 154 pm apart.

(1)

TCY-101 / 3520

4. Explain following with suitable example-
- Saytzeff's rule
 - Optical isomerism
5. On the basis of molecular orbital diagram, show the magnetic nature of Hydrogen Fluoride molecule.

Answer Any Four (4x5=20)

- Define Kohlrausch's law & its applications?
- Calculate the amount of lime & soda required to softened 15000 litres of water, which analysed as follows :
temporary hardness = 20 ppm; permanent hardness = 15 ppm; permanent Mg hardness = 10 ppm.
- An exhausted zeolite softener was regenerated by passing 150 liter of NaCl solution having strength of 1.5 gm/ L NaCl. Find the total volume of water that can be softened by this zeolite softener. If the hardness of water is 600ppm.
- What is Hardness of water? Explain any method to remove permanent Hardness of water.

5. Define rate of reaction? Time required to decompose SO_2Cl_2 to half of its initial amount is 60 minutes. If the decomposition is a first order reaction, calculate the rate constant of the reaction.

Answer Any Two (2x10=20)

1. Write synthesis, property and uses of followings:-
- PVC
 - PMMA
 - Teflon or PTFE
 - Phenolic Resins
2. What are biodegradable polymers? Define the biodegradation of natural biodegradable polymers.
3. Explain the conductivity of polymer with conjugated π - electron system. How the conductivity is enhanced by doping?

Answer Any Two (2x10=20)

1. Define determination of calorific value of fuel by Bomb calorimeter. The Following data is obtained in a bomb calorimeter experiment: Wt. of Fuel = 2.02 gm , Water equivalent of calorimeter = 585 gm, Water taken in calorimeter = 2500 gm , Observed rise in temperature

=2.5° C, Calculate the gross calorific value of fuel sample.
If the fuel contain 8.5% Hydrogen. Determine the LCV
of fuel. (Latent heat of Steam = 587 cal/gm).

2. What are Fuels? How are they classified? Enumerate the characteristics of good fuel.
3. Write a short note on-
 - i) Biomass as a source of energy
 - ii) Esterification & Transesterification.

Answer Any Two (2x10=20)

1. What is complexometric titration? Give the structure, function and application of EDTA.
2. Show the number of signals in NMR spectra of following compounds:
 $\text{CH}_3\text{CH}_2\text{COOH}$, $\text{CH}_3\text{CH}_2\text{OH}$, CH_3CHO , $\text{CH}_3\cdot\text{CH}_3$,
 $\text{CH}_3\text{OCH}(\text{CH}_3)_2$
3. Discuss the basic principles involved in- UV-visible, NMR, Mass spectroscopy.

—x—