

Printed Pages : 4

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EAS-102

(Following Paper ID and Roll No. to be filled in your
Answer Book)

Paper ID : 199122

Roll No.

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B.TECH

(SEM.I) THEORY EXAMINATION, 2015-16

Engineering Chemistry-I

Time: 3 hours]

[Total Marks:100

1. Attempt , all parts. All parts carry equal marks. Write
answer of each part in short. (10×2=20)

- (a) Give any two examples of optically active compounds without chiral centre.
- (b) What is metallic bonding.
- (c) Explain functionality of a polymer.
- (d) Explain why p-nitrophenol is more soluble than o-nitrophenol in water.
- (e) Arrange in increasing order of stability
 C_2H_5 , $C_6H_5CH_2^+$, $(CH_3)_2CH^+$
- (f) Why is the value of Gross Calorific Value (GCV) greater than Net Calorific Value (NCV).

(1)

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(g) Calculate the order and molecularity of the following reactions:



(h) Explain why hardness of water is expressed in terms of terms of CaCO_3 equivalents.

(i) Write any two examples of acid-base titration.

(j) Write down the structure of Zeigler-Natta catalyst.

Section-B

Note: Attempt any five questions from this section. (5×10=50)

2. On the basis of molecular orbital theory explain why F_2 is diamagnetic while O_2 is paramagnetic.

3. Write the mechanism of SN^1 & SN^2 reaction.

4. Describe the different conformation of n-butane with potential energy diagram.

5. Derive the equation for half life of first order reaction. A reaction that is of first order with respect to reactant A has a rate constant 6 min^{-1} . If we start with $[\text{A}] = 5.0 \text{ mol L}^{-1}$ when would $[\text{A}]$ reach the value of 0.05 mol L^{-1} ?

6. Write the mechanism of any two of the following:

(2)

6. Write the mechanism of any two of the following:

(a) Aldol condensation.

(b) Beckman rearrangement.

(c) Cannizzaro's reaction.

7. What is shielding and deshielding. Calculate the number of signal for following molecules:



8. What is hydrogen bonding? Differentiate between intra and intermolecular hydrogen bonding with suitable examples.

9. Describe the preparation, properties and application of any two of the following polymers.

(a) Nylon-6,6

(b) PMMA

(c) Bakelite.

Section-C

Note: Attempt any two questions from this section. (15×2=30)

10. (a) Differentiate between temporary and permanent hardness of water.

(3)

- (b) Define Chemical shift. What is its significance in the determination of the structure of molecules.
 - (c) What are biodegradable polymers? Discuss their application.
11. (a) Define the terms: Phase, Component and Degree of freedom.
- (b) Calculate the weight and volume of air required for combustion for 3 Kg of carbon.
 - (c) Calculate the density of silver which crystallizes in a face center cubic lattice with unit cell length of 0.4086 nm (Atomic wt of Ag=107.88)
12. (a) Explain why a pure metal rod half immersed vertically in water starts corroding at the bottom.
- (b) Calculate the energy of activation whose rate constant is tripled by 10°C rise in temperature in the vicinity of 27°C .
 - (c) Define bond order. Calculate the bond order and predict the magnetic behavior of CO , CO^{+} , CO^{-} .

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