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Total Pages : 4

300208

May 2019

B.Tech II SEMESTER

CHEMISTRY

(BSC102)

Time : 3 Hours] [Max. Marks : 75

Instructions :

(i) It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.

(ii) Answer any four questions from Part-B in detail.

(iii) Different sub-parts of a question are to be attempted adjacent to each other.

(iv) Any other specific instructions.

PART–A

1. (a) Define and explain crystal field theory. CO1 (1.5)

(b) Write down the Schrödinger wave equation describing various terms involved. CO1 (1.5)

(c) Define nmr spectroscopy. CO3 (1.5)

(d) What do you understand by the terms entropy and free energy? Explain briefly. CO2 (1.5)

(e) What is the principle of vibrational spectroscopy? (1.5) CO3

(f) Write down the equation of state for real gases. (1.5) CO2

(g) Allyl halides rapidly undergo nucleophilic substitution reactions while vinyl halides not. Explain. (1.5) CO5

(h) What do you understand by inert pair effect? Explain giving suitable example. (1.5) CO4

(i) Why enantiomers have same physical and chemical properties while diastereomers have different? (1.5) CO5

(j) Explain the effect of doping on band structures of solids. (1.5) CO4

PART–B

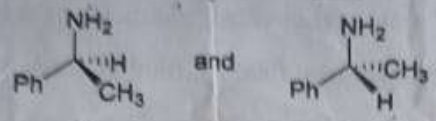
2. (a) Write down the electronic configuration and draw molecular orbital energy level diagram for N_2 molecule. CO1 (10)

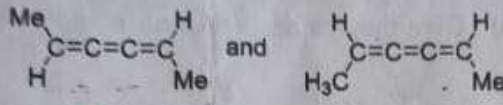
(b) Draw Pi-molecular orbitals of 1,3-butadiene. Also mention HOMO and LUMO. (5) CO1

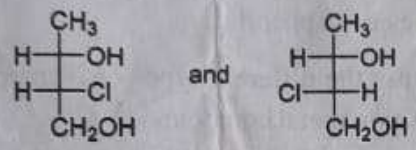
3. (a) Define the term fluorescence and give its applications in medicines. (10) CO3

(b) What do you understand by the term "spectroscopy". Discuss the various selection rules governing spectroscopy. (5) CO3

4. (a) Indicate the following compounds as enantiomers/ diastereomers/identical or none. (9)

(i)  and

(ii) 

(iii) 

(b) Define the following terms :

(i) Anomers.

(ii) Chirality.

(iii) Chiral axis. (6)

5. (a) Define the following terms;

(i) emf.

(ii) Potential difference.

(iii) Arhenius acids and bases.

(iv) Van Der Waals interactions. (8)

(b) Derive the Nernst equation and explain its various applications. (7)

6. (a) What do you understand polarizability? How does it differ from polarizing power. Discuss the Fazans rule for ionic and covalent character of a bond. (8)

(b) Explain crystal field splitting in octahedral complexes. (7)

7. (a) Give the synthesis of aspirin and its medical uses. (5)

(b) What do you understand by corrosion. Discuss its causes of happening. (5)

(c) Discuss the different types of isomerism possible in transition metal compounds. (5)
