

(i) Printed Pages: 4

Roll No.

(ii) Questions : 7

Sub. Code :

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B.Engg. 1st Year (1st Semester)

(2122)

MECHANICAL (Applied Chemistry)

(Common with CSE, MAC, ECE, EEE, IT)

Paper : ASC-X01

Time Allowed : Three Hours]

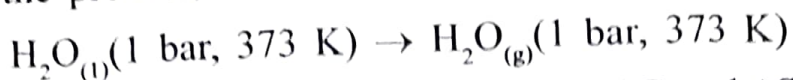
[Maximum Marks : 50

Note :—Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

1. Answer in brief :

- (1) Is $-\text{[CH}_2 - \text{CH(C}_6\text{H}_5\text{)]}_n$ a homopolymer or copolymer ?
Write the name of monomer/monomers.
- (2) Give magnetic behaviour of Na_2O_2 .
- (3) What are the parameters of expressing absorption ?
- (4) How many optical isomers are possible in a compound with one chiral carbon ?
- (5) Give one example of outer orbital and inner orbital complex each.

(6) For the process,

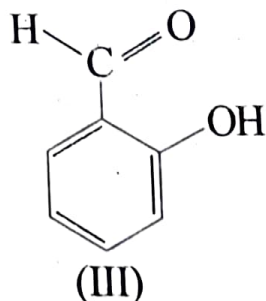
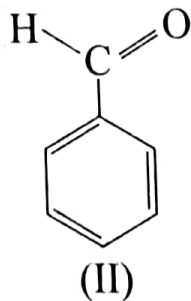
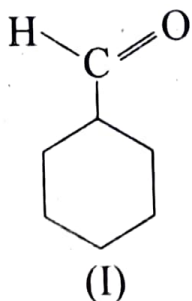


Write down thermodynamic parameters, ΔG and ΔS for this process.

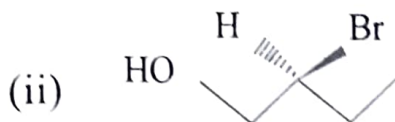
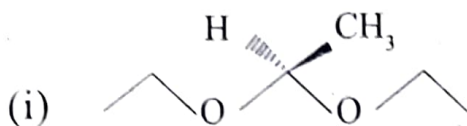
- (7) Why doctors advised to consume light food during high body temperature ?
- (8) What happened on absorption of IR and UV radiation by a molecule ?
- (9) What is the heat of neutralization of a strong acid and a strong base ? Why it is always constant ?
- (10) Give two examples of Wacker process. $10 \times 1 = 10$

SECTION—A

2. (a) Draw the shapes of various d orbitals and explain why they are split into two groups, t_{2g} and e_g in an octahedral ligand field. 4
- (b) Show by means of a diagram how the pattern of d orbital splitting changes as an octahedral complex undergoes tetragonal distortion and eventually becomes a square planar complex. 6
3. (a) Compare and explain the stretching frequency of carbonyl and C—C double bond. 4
- (b) Predict the frequency shift of the carbonyl absorption in the following aldehydes : 6

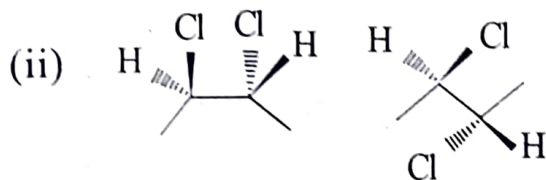


4. (a) Designate the R/S configuration for any chiral centres in the following molecules :



2

- (b) Mark the relationship between the following structures as either "same", "enantiomers" or "diastereomers".



2

- (c) Write different conformations of n-butane. Explain their relative stability. 6

SECTION—B

5. (a) Draw stereoregular forms of PVC. 4
- (b) Explain with reaction how does polyethylene produced using Ziegler-Natta catalyst differ from polyethylene produced using free radical initiators. 6

6. (a) Write the steps of mechanism for heterogeneous catalysis. 4
- (b) Draw steps for hydroformylation reaction using rhodium catalyst. How this reaction is different with $\text{Co}_2(\text{CO})_8$ catalyst. 6
7. (a) Derive Gibbs Helmholtz equation. Explain its application. 4
- (b) One mole of toluene is vaporized at its boiling point 111°C . The heat of vaporization at this temperature is 363.3 J/g . Calculate the maximum work done against 1 atm, q , ΔH , ΔE , ΔG and ΔS for the vaporization of one mole of toluene. 6