BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: IMSC **SEMESTER: III**
BRANCH: ALL **SESSION : MO/2018**

SUBJECT : IMC3001 CHEMISTRY III

TIME: 1.5 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

Q1 (a) For an isothermal reversible cyclic process, what will be the value of Q, W and ΔU? [2]

(b) Show that the heat absorbed in constant volume process is equal to increase in the internal energy of the system whereas that at constant pressure is equal to the increase in the enthalpy of the system. [3]

Q2 (a) Following are the observations for a single step process performed on an ideal gas, [2]
Q = 0,
$T_2 < T_1$ (T_2= final temperature and T_1= initial temperature)
Identify the process with justification .

(b) For the reaction. [3]

$$\frac{1}{2}\ H_2\,(g) + \frac{1}{2}\ Br_2\,(g) \longrightarrow HBr\,(g)$$

ΔH = −51.823 kJ mol^{-1} at 373 K. Calculate ΔU for this reaction at 373 K.

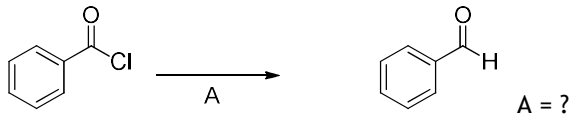
Q3 (a) Give reasons for the following facts. [2]
(i) Transition elements can form complexes.
(ii) Transition elements are less reactive than alkali and alkaline earth elements.

(b) Why do transition elements in zero and lower oxidation state form complexes with weak ligand like CO, NO, etc. Give the mechanism. [3]

Q4 (a) Although Cd is a transition element, its salt is colourless. Explain [2]

(b) Give reasons for variable oxidation state of transition element. How does stability of different oxidation state is determined by electrode potential. [3]

Q5 (a) [2]



(b) Explain the reaction mechanism of Perkin's Reaction. [3]

Q6 (a) Briefly describe the methods to distinguish between primary, secondary and tertiary alcohols using Victor Meyer Test with reaction sequence [2]

(b) Explain the reaction mechanism of i) Clemmenson Reduction and ii) Wolf-Kishner reduction. [3]

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