Registration No :

Total Number of Pages : 02

B.Tech.
BS1103

2ⁿᵈ Semester Back Examination 2017-18
CHEMISTRY - I
BRANCH : AEIE, AERO, AUTO, BIOMED, BIOTECH, CHEM, CIVIL, CSE, ECE, EEE, EIE, ELECTRICAL, ENV, ETC, FASHION, FAT, IEE, IT, ITE, MANUFAC, MANUTECH, MARINE, MECH, METTA, METTAMIN, MINERAL, MINING, MME, PE, PLASTIC, TEXTILE
Time : 3 Hours
Max Marks : 70
Q.CODE : C801
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.
Answer all parts of a question at a place.

Q1   **Answer the following questions:**   **(2 x 10)**
 a)   What is pseudo first order reaction? Give one example.
 b)   Write the differences between molecularity and order of a reaction.
 c)   The fusion curve in the phase diagram for water system has negative slope. Explain.
 d)   Determine the number of phases and components in the following system: $CaCO_{3\,(s)} \rightarrow CaO_{\,(s)} + CO_{2\,(g)}$
 e)   Compute the standard EMF of the cell containing Zn^{2+}/Zn and Cu^{2+}/Cu electrodes. $E^{o}_{Zn2+/Zn}$ = -0.76V and $E^{o}_{Cu2+/Cu}$ = +0.34V
 f)   What is Frenkel defect?
 g)   Define heat of combustion.
 h)   Define crystal lattice. How many atoms/particles present per unit cell of a BCC lattice.
 i)   Distinguish between open system and close system
 j)   Calculate the pH of the solution with [OH] = 1×10^{-10} M.

Q2 a)   Derive the expression for Gibbs-Helmholtz equation.   **(5)**
 b)   What is homogeneous catalysis? Discuss the mechanism of homogeneous catalysis with a suitable example.   **(5)**

Q3 a)   State the Hess' law of constant heat summation and describe its application.   **(5)**
 b)   For a cell, EMF is 0.0455 V at 298 K. Calculate ΔG, ΔH and ΔS for the cell reaction in the cell. Temperature coefficient, $(\partial E/\partial T)_p$ = 3.38×10^{-4} V/K   **(5)**

Q4 a)   Draw the molecular orbital diagram for O_2^{+} molecule. Write down the electronic configuration, bond order and magnetic behavior of it.   **(5)**
 b)   An element *A* (atomic mass 100g/mol) of BCC structure has an edge length of 400 pm. Calculate the density of *A* and the number of unit cells present in 15 g of *A*.   **(5)**

Q5 a)   Describe the methods for determining the order of chemical reactions.   **(6)**
 b)   Calculate the free energy change, when 4 moles of an ideal gas expands from a pressure of 10 atm to 1 atm at 25°C.   **(4)**

Q6 **a)** If dH = TdS + VdP, prove that $[\partial T/\partial P]_s = [\partial V/\partial S]_p$ **(5)**

b) Derive the integrated rate equation of a first order reaction and show that half-life period for this reaction is independent of the initial concentration of the reactant. **(5)**

Q7 **a)** Write the seven crystal systems along with lattice parameters and example. **(5)**

b) Calculate the de Broglie wavelength for **(5)**
A cricket ball of mass 100 g moving with velocity of 2000 m/s
An electron of mass 9.1 x 10^{-31} kg moving with velocity of 1.2 x 10^5 m/s.
Comment on the result.

Q8 **Write short answer on any TWO :** **(5 x 2)**

a) Dry cell

b) Quinhydrone electrode

c) Ionic solids

d) Born-Haber cycle