Registration No: | | | | | | | | | | |

Total Number of Pages: 02 **B.Tech.**
BS1103

1st Semester Back Examination 2017-2018
CHEMISTRY- I
BRANCH: AERO, AUTO, CHEM, CIVIL, CSE, ECE, EEE, EIE, ELECTRICAL, ETC, FASHION, IT, MECH, METTA, MINING, MME, PE, PLASTIC
Time: 3 Hours
Max Marks: 70
Q.CODE: B821

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions :** **(2 x 10)**

a) What do you mean by component? What is the maximum no of phases that can be in equilibrium at one point for one component system(T&P Constant)

b) What do you mean by zero order reaction? Give an example

c) Calculate the standard potential of the cell Pt(s)│H2(g)│H+(aq)‖ Ag+(aq)│Ag(s).
Given: E0Ag+/Ag = +0.8V

d) Aqueous solution of glucose has one phase. Whereas aqueous solution of carbon tetrachloride has two phase

e) Write down the Gibbs's Helmholtz equation and define term involved there in

f) Calculate the miller indices of crystal planes which cut through the crystal axes at (2a,-3b,-3c)

g) What do you mean by the planes of symmetry and Center of symmetry?

h) What is the value of ∂G for liquid water vaporizing at 337K and 1atm pressure?

i) What is the value of ∂G for liquid water vaporizing at 337K and 1atm pressure?

j) What is the coordination number of both the ions in CsCl structure?

Q2 Draw the phase Diagram of a one component system which contain more than one solid phase and Explain the following with help the Diagram. (i) Triple points (iii) Univariant system **(10)**

Q3 **a)** What do you mean by close packing in solids ?Give a comparative account of Hexagonal close packing(HCP) and Cubic close packing(BCC) in solids **(5)**

b) What is the standard EMF of the Electrochemical cell Made of Cd Electrode in a 1.0M Cd $(NO_3)2$ Solution and Cr electrode in 1.0M$Cr(NO_3)3$ solution E0 (Cd/Cd+2) =- 0.40v E0(Cr+3/cr)=-0.74v **(5)**

Q4 **a)** It was found that a cane sugar solution in water was hydrolyzed to the extent 25 percent in one hour .Calculate the time that will be taken for sugar to be hydrolyzed to the extents of 50%Assuming that reaction is of first order **(5)**

b) State Hess's Law of constant Heat of summation Calculate Heat of formation of Ethane. **(5)**
Given: Heat of combustion Ethane = -372.8Kj/mol
Heat of combustion of Carbon= -94.5Kj/mol
Heat of combustion of Hydrogen = -68.4KJ/mol

Q5 **a)** The heat of reaction for $N_2+H_2 \rightarrow 2NH_3$ at 270C is -91.94KJ What will be it value at 500C if molar heat capacities at constant pressure and 27 0C for N_2 and H_2 and NH_3 are 28.45.28.32 and 37.07J respectively **(5)**

b) What do you mean by Order and molecularity?Derive an expression **(5)**

Q6 **(a)** Prove that $Cp-Cv=[P+\{\partial U/\partial V\}_T][\partial V/\partial T]p$ **(7)**

(b) Discuss the characteristics of a good catalyst **(3)**

Q7 **(a)** What do you mean by Fuel cell. Write down the cell reaction of H2-O2 fuel cell **(5)**

(b) Draw the molecular orbital configuration ofN2and O2.Compare between them in reference to magnetic behavior and bond length. **(5)**

Q8 **a)** The standard electrode potentials of the electrodes, Ag+(aq)/Ag(s), and $Fe^{3+}(aq)/Fe^{2+}(aq)$, are 0.799 V and 0.771 V at 298 K, respectively. Write down the electrode reactions and designate the cell. Calculate he equilibrium constant for the cell reaction at 298 K, and calculate ∂G. ∂H **(5)**

b) For one mole of an ideal Gas T=f(P,V)show that ∂T is Perfects Differential **(5)**