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2007 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

II B.TECH I SEMESTER REGULAR EXAMINATIONS, NOVEMBER 2007

BIO CHEMICAL THERMODYNAMICS

(BIO-TECHNOLOGY)

SET NO -1

NOVEMBER 2007

TIME: 3 HOURS

MARKS: 80

Answer any FIVE Questions

All Questions carry equal marks

1. (a) Define any two of the following:-
   i. Energy
   ii. Property
   iii. Work
   iv. Equilibrium
2.
   (b) Differentiate between intensive and extensive properties with suitable examples.

[8+8]

2. Name the methods by which the thermodynamic properties of fluids are usually presented. Discuss any two of them

[16]

3. A particular thermodynamic system has the following the equations of state. 1
T =
5NR
2U ; P
T = NR V obtain the third equation of state of the system.

[16]

4. (a) Discuss the importance of fugacity in thermodynamics.
(b) Discuss fugacity and fugacity coefficient for pure species.

[16]

5. (a) Define Lewis?s Randall and Henry?s rule Discuss the importance of above rules in brief.
(b) Show that lim ?i = 1.0

[8+8]

6. Rate and equilibrium conversion of a chemical reaction depends on what parameters? How rate and equililnium conversion varies in various situations. Give a suitable example to explain above.

[16]

7. (a) Explain the Gaden classification from stoichiometric point of view the product formation in fermentation processes.

(b) The following stoichiometric equation describes penicillin systhesis: 1.5 Glucose + H2SO4 +2NH3 +phenylacetatePencilliumG+CO2 +8H2O the the oretical yield of pencillium is 1.2g (gram of glucose). Find out the molecular weight of pencillium G.

[16]

8. Some microorganismsm exhibit growth inhibition in the presence of excess oxygen. Assuming that the growth dependence on oxygen can be represented by
μ = μm.C02L
K02+C02L+(C2 02L/K1) Where K02is oxygen saturation constant K1is inhibition constant C02,L is the dis solved oxygen concentration Show that the specific growth rate(μ) reaches a max imum value (6=μm) at a dissolved oxygen concentration ofC02, L = [K02.K1]1/