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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 -2
NOVEMBER 2007

TIME: 3 HOURS
MARKS: 80

Answer any FIVE Questions
All Questions carry equal marks

1. A reversible engine operating between a reservoir at 600K and the ambient at mosphere at 300K drives a refrigerator operating between 240K and the ambient atmosphere. Determine the ratio of energy rejected by both the devices to the ambient atmosphere to the energy absorbed by the engine from the reservoir at 600K. [16]

2. Name the methods by which the thermodynamic properties of fluids are usually presented. Discuss any two of them [16]

3. (a) Give an example of a fundamental relation.

(b) What is an equation of state? How many equations of state are there for a single component of simple compressible substance? [6+10]

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. (a) What is Le chattelier?s principle? Give suitable examples to explain above principle.

(b) Discuss the effect of insert gas addition on conversion for various situations. [8+8]

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. Write Short notes
(a) Elemental Balance
(b) Heat balance in Substrate consumption