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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

Test -1, SEPT, EXAMINATION - 2016

B.Tech (BT) III[rd] Semester

COURSE NAME: Thermodynamics and Chemical processes MAX.MARKS:15

COURSE CODE: 10B11BT311 MAX.TIME: 1 HR.

Note: Carrying of mobile phones during examinations will be treated as a case of unfair means.

Q1(a). Explain the concept of continuum. 1

(b). Why more heat is required in C_p as compare to C_v. 1

Q2(a). Elucidate the applications of Gibbs free energy in biological systems. 2

(b). Elaborate why ATP molecules are considered as universal currency for biological energy according to bioenergetics. 2

Q3(a). Describe coupled reactions by giving an example. 2

(b). Calculate ΔG^{o} and $\Delta G^{o'}$ for reaction A $\rightarrow$ B, if K_{eq} = 0.0475 and initial concentration of A is 2 X 10^{-4} M and that of B is 3 X 10^{-6}M. 2

Q4(a). Calculate the increase in entropy of 1 Kg of ice(0°C) when it is converted into steam (100°C). (Latent heat of ice is 80 Kcal/Kg and Latent heat of steam is 540 Kcal/Kg). 2

(b). The following reaction catalyzed by phosphoglucomutase occurs during break down of glycogen:

glucose 1-phosphate $\leftrightarrow$ glucose 6-phosphate

A reaction is started by adding phosphoglucomutase to 0.04 gmol glucose 1-phosphate in 1 litre solution at 25°C. The reaction proceeds to equilibrium at which concentration of glucose 1-phosphate is 0.002M and the concentration of glucose 6-phosphate is 0.038M

(a). What is the Equilibrium constant?

(b). What is the theoretical yield?

(c).What is the yield based on amount of reactant supplied? 3