Roll No									

B.E / B.Tech. DEGREE END SEMESTER EXAMINATIONS, NOV/DEC 2011

Common to all Branches

CY9111- CHEMISTRY I

FIRST SEMESTER – (R 2008)

Time: 3 hr Max. Mark : 100

Instructions: 1. .....

2.....

Answer ALL Questions

Part –A (10 x 2 = 20 Marks)

1. Calculate the change in entropy accompanying the isothermal expansion of 8 moles of an ideal gas at 298 K until its volume has increased six times.
2. What are the statements of Kelvin and Clausius?
3. What is a condensed phase rule?
4. Define Degree of freedom.
5. What are solid acid catalysts? Why they are superior to conventional catalysts?
6. What is auto catalysis? Give an example.
7. Comment on nucleophiles and electrophiles with an example.
8. What is an electronic transition?
9. What are quantum wells? Give one example.
10. What are nanocomposites?

Part B- (5 x 16 =80)

11. (i) What are substitution reactions? Explain the SN^2 reaction mechanism with suitable example. (8)

    (ii) Discuss the principle, instrumentation (block diagram) and applications of UV visible spectroscopy. (8)

12. (a) i) Derive all the four Maxwells relations (8)

    ii) Derive the Gibb's Helmholtz equation in terms of change in free energy. Give its applications. (8)

    (OR)

    (b) i) Derive an expression to relate the equilibrium constant of a reaction with its standard free energy change. (8)

    ii)The equilibrium constants for the reaction

    $N_2 + 3\ H_2 = 2\ NH_3$

    is 1.64×10^{-4} and 0.144×10^{-4} at 400° C and 500 ° C respectively. Calculate the heat of the reaction in terms of calories. (4)

(iii) Prove: Net work = $-\Delta G$ (4)

13. (a) i) With a neat phase diagram, explain the salient features of Zn-Mg alloy system (8)
ii) Draw and explain the phase diagram of water system. (8)

(OR)

(b) i) Draw a phase diagram of Iron-carbon system and indicate the various phases (8)
ii) Draw and explain the phase diagram of Pb-Ag system. Give its applications (8)

14. (a) i) Differentiate between the physical absorption and chemical absorption (8)
ii) Derive Michael- Menten equation. Show that the order of the reaction changes with substrate concentrations (8)

(OR)

(b) i) What are the postulates of Langmuir adsorption isotherm? Derive the Langmuir adsorption isotherm equation. (8)
ii) What are catalyzed reactions? What are its characteristics? (8)

15.(a) i) How are carbon nanotubes synthesized? What are its applications? (8)

ii) What are nanoparticles? Write any four methods of preparation of nanoparticles. (8)

(OR)

(b) i) Discuss in detail about the nanosensor devices (8)

ii) Discuss the applications of nanochemistry in biology and medicine (8)

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