STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted during the academic year 2004-05 & thereafter)

SUBJECT CODE: CH/AC/GC42

B.Sc. DEGREE EXAMINATION, APRIL 2008
BRANCH III - PHYSICS
FOURTH SEMESTER

Reg. No ………………………..

COURSE : ALLIED – CORE
PAPER : GENERAL CHEMISTRY-II
TIME : 30 MINUTES   MAX. MARKS : 30

SECTION – A

TO BE ANSWERED ON THE QUESTION PAPER ITSELF.
ANSWER ALL THE QUESTIONS.   (30x1=30)

I   Choose the correct answer:

1.   Vulcanized rubber resists
        a) jerking movement   b) cold temperature
        c) drops of acid rains   d) wear and tear due to friction.

2.   Which of the following is synthetic rubber?
        a) Buna – S   b) Neoprene   c) Both   d) None

3.   Raw material used for Nylon – 6 is
        a) Adipic acid   b) Aniline   c) Phthalic acid   d) caprolactum

4.   The number of degrees of freedom in the following system,
        $CaCO_{3(s)} \rightleftharpoons CaO_{(s)} + CO_{2(g)}$
        a) 2   b) 3   c) 1   d) 0

5.   Radioactive decay follows
        a) zero order kinetics   b) first order kinetics
        c) pseudo first order   d) second order kinetics

6.   For the first order reaction $A \rightarrow$ products, the half life time is $100s^{-1}$. The rate
        constant of the reaction is
        a) $6.9 \times 10^{-2} s^{-1}$ b) $6.93 \times 10^{-4} s$ c) $6.93 \times 10^{-3} s^{-1}$ d) $6.93 \times 10^{-5} s$

II   State true or false:

7.   Nylon 66 is a polymer of polystyrene.
8.   Guttapercha is an isomer of natural rubber.
9.   The Phase Rule states that $P + F = C - 2$.

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10. A solution of sugar in a beaker at room temperature has two phases.
11. A catalyst can start a chemical reaction.
12. The rate of an exothermic reaction increases with increasing temperature.

III Fill in the blanks:

13. Bakelite is the plastic formed by the combination of _____ and

_____.

14. The monomer of PVC is _____.

15. Three phases are at equilibrium at the _____ _____ in

a two component system.

16. The number of phases in a mixture of CO_2 and O_2 is _____.

17. The decolourisation of $KMnO_4$ by oxalic acid is catalysed by _____.

18. The use of a catalyst in chemical reaction _____ activation energy

of the reaction.

IV Match the following:

19. (a) PMMA   (i) Polyamide
    (b) Natural Rubber   (ii) Adipic Acid
    (c) Natural silk   (iii) Methyl methacrylate
    (d) Teflon   (iv) Tetra fluoro ethylene
    (e) Nylon – 66   (v) isoprene

20. (a) Synthesis of NH_3 (i) $H_2 + I_2 \rightleftharpoons 2HI$

    (b) Hydrogenation of oil   (ii) $k = A.e^{-E_a/RT}$
    (c) Zero order reaction   (iii) s^{-1}
    (d) First order reaction   (iv) Fe
    (e) Arrhenius equation   (v) Ni

V Answer the following in a line or two:

21. Define order of a reaction.

22. What are liquid crystals?

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BRANCH III - PHYSICS
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COURSE   :   **ALLIED – CORE**
PAPER   :   **GENERAL CHEMISTRY-II**
TIME   :   **2 HOURS**   MAX. MARKS : 70
SECTION – B
ANSWER ANY FIVE QUESTIONS.   **(5x10=50)**

1   (a) Name the monomers of the following polymers.
         (i) Polythene   (ii) Nylon   (iii) Natural Rubber
         (iv) DVC   (v) Terylene   (vi) PETP
                                                                   (6)
      (b) What are the differences between thermoplastic and thermosetting polymers?
                                                                   (4)

2   Explain (i) Mesomorphic state   (ii) The Swarm Theory
              (iii) Cholesteric liquid crystals   (3+4+3)

3   (a) How is Bakelite prepared?
      (b) Calculate the no. of components, phases and degrees of freedom in the
            following systems.
         (i) water in a beaker at room temperature.
         (ii) sulphur at the transition point.

4   Draw and explain the phase diagram for Pb-Ag system. Discuss the practical
      application of this phase diagram.

5   Derive the expression for the rate constant of a second order reaction involving
      tow reactants A and B with different concentration.

6   The optical rotation of sucrose of 0.9 N HCl at various times is given in the
      following table.

Time (mts)	0	7.18	18	27.05	∞
Rotation (degrees)	+24.09	+21.4	+17.7	+15	-10.74

      Show that the reaction is of the first order.

7   Define and explain the following
      (a) Catalyst   (b) Auto Catalysis   (c) Promotor
      (d) Catalytic poisons   (e) Negative Catalysis

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SECTION – C
ANSWER ANY ONE QUESTION. (1x20=20)

8. (a) Describe any two methods of determining the order of reaction. What do you understand by zero order reaction ? (3+3+4)

    (b) In the Arrhenius equation, for a certain reaction the values of A and Ea (energy of activation) are 4×10^{13} sec^{-1} and 98.6 $K\,J\,mol^{-1}$ respectively. If the reaction is of first order, at what temperature will its half life period be 10 mts. ? (10)

9. (a) State and derive Phase Rule. (1+3)

    (b) Construct the phase diagram of Cu – Ni system. Explain its salient features with a special mention about Lever Rule. (6)

    (c) Write notes on (i) vulcanization of rubber (ii) application of polymers.

    (4+6)

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