MANIPAL UNIVERSITY
I SEMESTER B.E. END SEMESTER EXAMINATION
SUBJECT: ENGG. CHEMISTRY (CHM 101)
(Make up Examination)

Time : 3 hrs   Date: 30-12-2009   Max. Marks: 50

NOTE : Answer any FIVE full question

1A   i)What is unleaded petrol? What are its advantages?
        ii) Solutions of high conductance are used in electroplating: Justify
1B.   i) Derive Nernst equation for single electrode potential.
        ii) Explain the construction and working of a glass electrode. Mention any two of its advantages and disadvantages.
1C.   With a neat diagram explain an experimental method to determine the calorific value
        of a solid fuel using Bomb calorimeter.

                                                        (2+ 4+4 =10M)

2A   Give reasons for the following.
        i) PVC is soft and flexible; where as Bakelite is hard and brittle.
        ii) Virgin rubber is useless as pure gold.
2B   i)What do you understand by vulcanization of rubber? What are its advantages and disadvantages? Give the structural unit of vulcanized rubber.
        ii) Give the preparation and any two applications of Epoxy resin
2C.   i) A coal has the following composition by weight : C = 90%; O = 3.0%; S = 0.5%; N = 0.5% and ash = 2.5%. Net calorific value of the coal was found to be 8,490.5 kcal/kg. Calculate the percentage of hydrogen and higher calorific value of coal.
        (ii) Explain pitting corrosion.

                                                        (2+ 4+4 =10M)

3A.   Give reasons for the following:
        i) Galvanized articles should not be used for storage of food products.
        ii) Wire mesh corrodes at the joints.
3B.   i) Give an account of passivity of metals.
        ii) Explain cathodic protection of metals.
3C.   i)Explain suspension polymerization and   give any two of its advantages and disadvantages.
        ii) What are the differences between natural rubber and gutta percha.

                                                        (2+ 4+4 =10M)

4A.   i) Write any two differences between electroplating and electroless plating.
4B.   i) Write   an informative note on effect of structure on crystalllinity and chemical resistance of polymer.
        ii) Give the construction of lead storage cell and write the reactions taking place during its discharge.
4C.   Give an account of electroless plating of copper.

                                                        (2+ 4+4 =10M)

5A   Give reasons for the following:

        i) Why is calorific value of water gas higher than that of producer gas?

        ii) Concentration of KOH remains invariant in Nickel Cadmium cell.

5B   i) With suitable examples explain the function of cathodic inhibitors in corrosion control.

        ii) Explain the mechanism of free radical polymerization of ethylene.

5C   i) What are concentration cells? Derive an expression for e.m.f of a concentration cell.

        ii) Calculate the emf of the concentration cell at 25^oC

        Ag(s)/AgNO$_3$ (0.018 M) / AgNO$_3$ (1.20 M) /Ag(s).

        If water is added to the more dilute solution what happens to the emf of the cell

                                                           (2+ 4+4 =10M)

6A   Make a clear distinction between the following (Any two points)

        i) Polythene and silicone rubber

        ii) Galvanic cell and fuel cell.

6B   i) Give a brief account of antiknocking agents

        ii) Distinguish between Galvanizing and Tinning

6C   i) With a neat diagram explain the production of producer gas. Mention any two of its applications

        ii) Explain the construction and working H$_2$ – O$_2$ fuel cell. Mention any   two of its advantages   and disadvantages of the same.

                                                           (2+ 4+4 =10M)