

Total No. of Pages 2

Roll No.

FIRST SEMESTER

B.Tech. (Group A)

END SEMESTER EXAMINATION

(Nov.-Dec.-2012)

AC-104 APPLIED CHEMISTRY

Time: 3:00 Hours

Max. Marks : 70

Note : Question No. **ONE** and **SEVEN** are compulsory.
Answer any **FOUR** questions from the remaining.
Assume suitable missing data, if any.

1 Answer the following questions :

[a] Write three examples of Redox indicators.

[b] Arrange the following bonds in increasing order of their stretching vibrational frequencies (wave number):

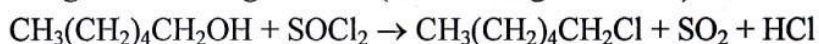
- C-H, C-O, C-I, C-C
Justify your answer.

[c] Write the name and structure of an inorganic polymer and also write its applications.

[d] You are asked to separate a mixture of two proteins with different pI (Isoelectric point) values. Using this information, which technique should be used? Explain.

[e] Write the composition of a Lithium Ion Battery. Discuss the advantages of Lithium-ion batteries.

[f] Calculate the % atom economy for the preparation of 1-chlorohexane using the following reaction (atomic weight of S=32):



[g] Write one example each for Green reagents, Green solvents and Green catalysts.

3×7=21

2[a] Titration of Ca^{2+} and Mg^{2+} in a 50 ml sample of hard water required 23.65 ml of 0.01205 M EDTA. A second 50-ml aliquot (portion) was made strongly basic with NaOH to precipitate Mg^{2+} as $\text{Mg}(\text{OH})_2$. The supernatant (precipitate – free) liquid required 14.53 ml of the EDTA solution. Calculate :

6

23.65
14.53

9.12

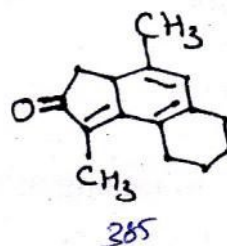
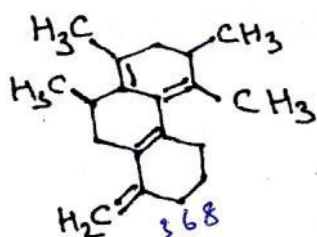
- (i) Total hardness of the water sample, expressed in terms of CaCO_3 (in ppm).
- (ii) The concentration of CaCO_3 (in ppm) in the sample.
- (iii) The concentration of MgCO_3 (in ppm) in the sample.

[b] Explain the principle, instrumentation, and applications of DTA.

6

3[a] Using Woodward-Fieser rules, find out the λ_{max} values for the following compounds:

6



[b] Describe copolymerization and types of copolymers. Write two examples of important copolymers and draw the structures of their monomers.

6

4[a] What is a fuel cell? Describe the principle and functioning of the H_2 - O_2 fuel cell. Name two additional compounds that can be used as fuels.

6

[b] What is electroplating? Describe its principle and also explain the composition of an electroplating bath in general.

6

5[a] Suppose you own/manage a chemical industry. Describe six principles that you are going to follow in order to maintain Green chemistry environment in your industry.

6

[b] Write Gibb's phase rule and define the terms involved. Explain the phase diagram of water system in detail.

6

6 Write short notes on (**any THREE**):

[a] Cationic polymerization.

[b] DNA

[c] Phase-diagram for a two component system

[d] Double-beam UV-visible spectrophotometer.

4×3=12

7 List a few things in your daily routine that **do not** involve chemistry.

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