Total No. of Pages 3

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FIRST SEMESTER

B.Tech. [GROUP-A]

END SEMESTER EXAMINATION **NOV.-DEC.-2011**

AC-104 APPLIED CHEMISTRY

Time: 3 Hours ***Maximum Marks : 70***

Note : Question No. ***ONE*** is compulsory.
Answer any ***FIVE*** questions from the rest.
Assume suitable missing data, if any.

1 Answer the following questions: **2x10=20**

[a] Draw the structural charges in case of methyl orange under the different pH conditions.

[b] Show the formation of A = T with structure.

[c] IR absorption frequency due to > C = 0 occurs at higher (υ) frequency than C = C. Why?

[d] Write the types of polymerization that may be carried out using the following initiators:

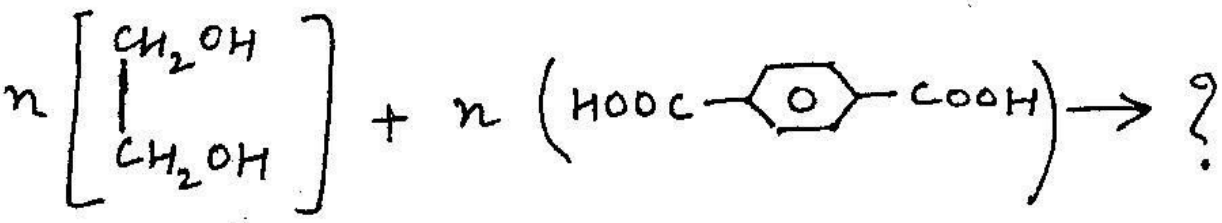
AIBN, RMgX, $TiCl_4 / AlMe_3$, $BF_3.H_2O$

[e] What do you mean by T_g?

[f] Define Buffer. Give an example of acidic and basic buffer each.

[g] Explain the structural changes taking place during denaturation of proteins.

[h]

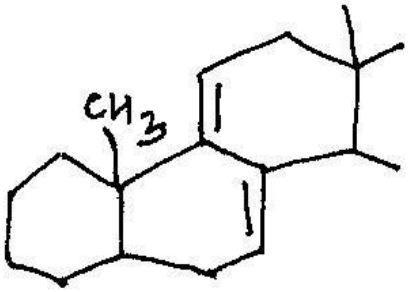


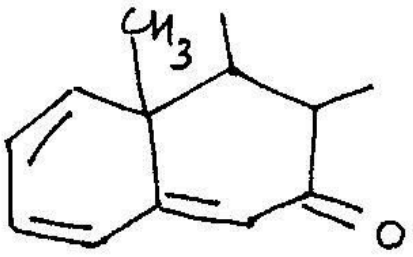
Complete the reaction. Name the product and its use.

[i] What is meant by an external indicator? Give an example.

[j] For a one component system, triple point is an invariant point? Comment.

2[a] Discuss characteristics of battery (any four). Discuss the toxic effluents from the battery industries. **4**





7[a] Write any five principles of green chemistry. Explain green solvents in detail. **5**

[b] What do you mean by enantiotropy? Draw and explain all the triple points existing in the phase diagram of sulphur. **5**

8 Short notes on any three: **10**

(i) Electroplating

(ii) Biocatalysis

(iii) Fuel cells

(iv) DSC

$O_2 \rightarrow 2O^-$
$+2e^-$

$O_2 + 2e^- \rightarrow 2H_2O$
$+2H^+$

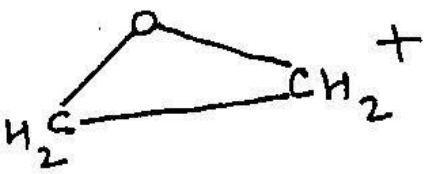
$O_2 \rightarrow 2O^{2-}$
$+4e^-$ $+4H^+$
$+4H^+$

$O_2 + 2H_2O \rightarrow 6H_2O$
$+4e^-$

[b] The following two step route (known as chlorohydrin route) is used for the industrial synthesis of ethylene oxide.

$$H_2C=CH_2+Cl_2+H_2O \rightarrow Cl-CH_2-CH_2-OH+HCl$$

$$Cl-CH_2-CH_2-OH+Ca(OH)_2 \rightarrow$$



$+ CaCl_2 + 2H_2O$.

Calculate the atom economy for the synthesis of ethylene oxide. 3

[c] Draw the phase diagram of Pb-Ag system. 3

3[a] Explain mutarotaion taking the help of glucose structure. Write the product when glucose is allowed to react with Br_2 water & Conc. HNO_3. 4

[b](i) How will you distinguish between CH_3COOH and CH_3COCH_3 with the help of IR spectra. 2

(ii) What are the wavelength ranges for visible and IR radiations? 2

[c] Write four important applications of thermo-gravimetry. 2

4[a] What is Zeigler Natta catalyst? Explain its significance. Classify polymers on the basis of their tacticity. 5

[b] What is the purity of conc. H_2SO_4 solution (sp. Gravity 1.8 g/ml) if 5.0 ml of this sol. is neutralised by 84.6 ml of 2.0 N NaOH? 3

[c] In the presence of O_2, draw DTA thermogram of calcium oxalate. 2

5[a] Discuss the theories of indicators. Explain the structural change in diphenylamine in Redox titrations. 5

[b] A solution contains 1:2 ratio of masses of particles of two substances with molar masses 10 kg/mol & 20 kg/mol, respectively. Determine the number average and mass average molar mass. 3

[c] Write three criterion for the formation of solid solution. 2

6[a] Draw the structure of any trinucleotide. What are complete & incomplete proteins. Give an example of each. 6

[b] Calculate λ_{max} for the following compounds. 4