DTU/11/0819

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FIRST SEMESTER **B.Tech. (GROUP-A)**

MID SEMESTER EXAMINATION ***September-2011***

AC-104 APPLIED CHEMISTRY

Time: 1 Hour 30 Minutes ***Max. Marks : 20***

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

1 Answer the following questions:- **1x8**

[a] Write the name and structure of EDTA.

[b] What is the required condition for a molecule to be IR active.

[c] What are the sources of UV-Vis radiation in UV-Vis spectrophotometer?

[d] Draw a general thermogram for multiple decomposition of a molecule.

[e] Name any natural polymeric indicator. Write the molecular formulae for the monomer.

[f] Write down any two criterion for a substance to be a primary standard. Give two examples of primary standard.

[g] Give the characteristic IR absorption frequency range for >C =0 & -OH gp. each.

[h] Write the names of all bending vibrations in IR spectroscopy.

2 Explain the mechanism of free radical addition polymerization. **3**

3[a] Write down any four important applications of thermal methods of analysis. **2**

[b] Draw a flow chart diagram of IR spectrometer. **1**

4 A 20.00 mL sample of vinegar, an aqueous solution of acetic acid (CH_3COOH) is titrated with 0.5062 M NaOH and 16.58 mL is required to reach the end point.

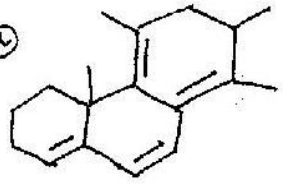
[a] What is the molarity of acetic acid? **½**

[b] If the density of vinegar is 1.006 g/cm^3, what is the mass percent of acetic acid in the vinegar? **1**

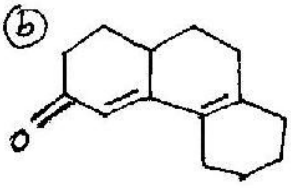
[c] What is a suitable indicator for this titration? Draw the appropriate structures for the change in colour of the indicator. 1½

5 Find out the λ_{max} using Woodward-Fieser rules. 1x3

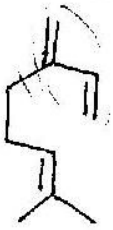
(a)



(b)



(c)



6 Define and classify titrations. Write short note on precipation titration. 3

7[a] An aqueous solution containing 8.75 ppm $KMnO_4$ has a transmittance of 0.743 in a 1.00 cm cell at 520 nm. Calculate the molar absorptivity of $KMnO_4$.

(At. Wt. of K = 39, Mn = 55). 2

[b] Arrange the following transitions in the increasing order of energy required.

$\pi \rightarrow \pi^*, \sigma \rightarrow \sigma^*, \eta \rightarrow \pi^*, \eta \rightarrow \sigma^*$. 1

$A = \varepsilon c l$

$A = -\log T$