Total No. of Questions : 6]

SEAT No. :

P1413

[Total No. of Pages : 3

[5123]-416
M.Sc. - II
ANALYTICAL CHEMISTRY
CHA - 491 : Analytical Methods for Analysis of Fertilizers, Detergents, Water, Polymer, Paint and Pigment
(2013 Pattern) (Semester - IV)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***All questins of respective section are compulsory.***
2) ***Figures to right hand side indicate full marks.***
3) ***Neat labelled diagram must be drawn wherever necessary.***
4) ***Use of log-table / non-programmable calculator is allowed.***
5) ***Write the answers of two sections on separate answer books.***

SECTION - I

Q1) Answer the following: **[10]**

a) What is Saponification value?

b) Enlist alcohol soluble material found in detergents.

c) How free water is determined from fertilizer?

d) Explain the terms:

i) DO

ii) BOD

e) Give the principle for determination of lead by dithiozone method.

Q2) Attempt any two of the following: **[10]**

a) Outline the procedure for determination of Nitrogen by Kjeldahls method.

b) Discuss a method to extract and estimate unsulphonated and unsulphated material from sample of detergent.

c) Explain analytical method for the determination of Arsenic from waste water.

P.T.O.

d) A 0.401g of sample of commercial phosphate detergent was ignited at red heat to destroy organic matter. The residue was taken up in hot HCl which converts the phosphorus to H_3PO_4. The phosphate was precipitated as $MgNH_4PO_4.6H_2O$ by addition of Mg^{2+} ions followed by aqueous NH_3. After filtration and washing, the precipitate was converted to $Mg_2P_2O_7$ by ignition to 1000ºC. The weight of the residue was found to be 0.262g. Calculate the percentage of phosphorus in the sample.

Q3) Attempt <u>any one</u> of the following: **[5]**

a) Write a short note on domestic waste water treatment.

b) Give a suitable method for estimation of equivalent combined SO_3 from detergent sample.

SECTION - II

(Polymer Analysis)

Q4) Answer the following: **[10]**

a) Explain 'Impact test' and 'abrasion resistance'.

b) Define 'emulsion paints and enamels'.

c) Define glass transition temperature.

d) Give classification of polymer.

e) How Mechanical properties can be used in Physical testing of polymer?

Q5) Answer any two of the following: **[10]**

a) Distinguish between addition and condensation polymerisation.

b) Explain identification of binders from paints.

c) Explain the method to determine molecular weight of polymer by viscosity measurement.

d) A 250 mg of yellow chrome pigment was disintegrated and the soluble chromate was extracted with sulphuric acid. The volume of the solution was made up to 100 ml. A 25.0ml aliquot of this solution was used for chromate estimation iodometrically, which required 12.7ml of standard 0.05N sodium thiosulphate for complete reaction. Calculate the percentage of CrO_3 in the given pigment sample.

(Given: Atomic wt. of Cr = 51.99)

Q6) Answer any one of the following: **[05]**

a) What are pigments? Discuss the analytical method for the estimation of zinc from the pigment sample.

b) 0.8321gm of carboxyl terminated polybutadiene was dissolved in mixture of ethanol and toluene. The mixture was titrated with 0.1234N alcoholic KOH using Phenolphthalein as an indicator. The burette reading was 7.8ml. Calculate the number average molecular weight of polymer.

(Given: Functionality = 2).