Total No. of Questions :4]

SEAT No. :

P2626

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M.Sc. - II

ANALYTICAL CHEMISTRY

CH - 391: Environmental and Analysis of Industrial Materials

(2008 Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***All questions are compulsory and carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of logarithmic tables, non-programmable calculator is allowed.***

SECTION -I

Q1) Attempt any four of the following: **[20]**

a) What is compound fertilizer? Explain Na-tetraphenyl borate method used for determination of Potassium from mixed fertilizers.

b) Explain the method for determination of CaO in the sample of cobalt glass.

c) Explain the procedure for estimation of zinc by using 8 - hydroxyguinoline from deodorants and antiperspirants.

d) Explain the term explosive. How is heat of explosion measured by adiabatic calorimeter?

e) 10 ml of 0.01 M $ZnSO_4$ solution required 9.5 ml of EDTA solution for complete reaction. 0.250 gm of sample containing magnesium was dissolved in 100 ml of acid. An aliquot of 10 ml of same solution required 11 ml EDTA solution. Calculate percentage of magnesium in the sample. [Given: At.wts. Mg = 24.31]

P.T.O.

Q2) Attempt any four of the following: **[20]**

a) Describe importance of pigment volume concentration in surface coating industries.

b) What is sampling? Mention the methods of sampling. Explain the method used for sampling of explosire.

c) Outline the procedure for determination of chromium from pigments.

d) A sample of detergent weighing 7.550 g was dissolved in water and solution was diluted to 100 ml in a volumetric flask, 10 ml of an aliquot of this solution required 11 ml of 0.005 N CETAB solution for complete reaction. Calculate percentage of combined SO_3 present in the sample. [Given: At. wts. O = 16, S = 32]

e) 0.135 g. of nitrogen fertilizer was dissolved in acid and made strongly alkaline with NaOH. The solution was heated and liberated ammonia was absorbed in exactly 50 ml of 0.050 N M_2SO_4. The unused H_2SO_4 was back titrated with 0.05 N NaOH and burette reading was 20 ml. Calculate the percentage of nitrogen in the sample. [Given: At wts. N = 14]

SECTION -II

Q3) Attempt any four of the following: **[20]**

a) Explain the analytical procedure for estimation of calcium from Dolomite ore.

b) Outline the analytical procedure for the determination of any one of the following:

i) Chromium from steel.

ii) Iron from bauxite ore.

c) Give the constituents of Ileminite. Explain the analysis of Titanium from Ileminite ore.

d) 0.150 gm of bauxite ore was disintegrated by suitable method. After removal of impurities the filtrate containing Al^{+3} ions was diluted to 100 ml. An aliquot of 25 ml required 26 ml of 0.0098 M EDTA solution for complete reaction. Calculate percentage of Al_2O_3.

e) 0.25 gm of yellow-chrome pigment was disintegrated and soluble chromate was extracted with H_2SO_4. The solution was diluted to 100 ml. An aliquot of 10 ml required 11.0 ml of 0.05 N $Na_2S_2O_3$ solution in iodometric titration. Calculate the percentage of chromium and CrO_3 in the given sample. [Given: At. wts, Cr = 52, O = 16]

Q4) Attempt <u>any</u> <u>four</u> of the following: **[20]**

a) Explain the analytical method for estimation of arsenic from waste water.

b) Write a note on catalytic converter.

c) How NO_x is generated? Explain its hazavdous effect on material. How is it controlled?

d) What is sludge? give the any two methods used for disposal of sludge.

e) Explain principle and construction of cyclone separator.

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