Total No. of Questions : 4]

SEAT No : ____

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M.Sc. - II

ANALYTICAL CHEMISTRY

CH-392: Advanced Analytical Techniques

(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.***
5) ***Use of graph paper is allowed.***

SECTION - I

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

a) State and explain Faraday's laws of electrolysis. Give its important application.

b) Explain the terms :

i) Transformer ii) Resistor

iii) Capacitors iv) Conductance

v) Inductors

c) Write a critical note on discrete sample analyzer.

d) Describe the role of microprocessor control in AAs.

e) Calculate the output voltage with turn ratio 15:1 when voltage of 230 V is applied to the primary coil.

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

a) Explain the difference between metallic conductor, insulator and semiconductors on the basis of band theory.

P.T.O.

b) What is meant by rectification? Describe the working of crystal diode as half wave rectifier.

c) Write short note on continuous flow analyzers.

d) How long must a 0.320 A current flow in order to plate 0.742g of copper from Cu (II) sulphate.

[Given At. Wt. of Cu = 63.54g, F = 96487C]

e) 3 Capacitor are connected in series across 230V d.c. supply out of which two are with capacity 6 μf, 16 μf. and third one of unknown capacity. The total capacitance is 2 μf. Calculate value of unknown capacitor and voltage across each capacitor.

SECTION-II

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

a) Explain the following terms with respect to AAS.

i) Spectral interference ii) Chemical interference

iii) Ionisation interference iv) Releasing agent

v) protective agent

b) Explain the role of supercritical Fluid Chromatography as an analytical tool in pharmaceutical analysis.

c) Describe how the laser enhanced ionisation technique is useful for detection of various gases, liquids and solids.

d) Explain clinical application of the radioimmuno assay of insulin.

e) 10ml sample of blood was treated with trichloroacetic acid to precipitate proteins. After centrifugation the resulting solution was brought to P^H 3 and extracted with 2 ml portion of methyl isobutyl ketone containing the organic lead complexing agent. The extract was aspirated directly into an air acetylene flame and yields absorbance 0.266 at 283.3 nm. 5 ml aliquot of standard solution containing 0.2 ppm and 0.3 ppm of lead were treated in same way yielding absorbance 0.198 and 0.299. Calculate ppm of lead in blood sample.

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

a) Write a note on Resonance ionization spectroscopy.

b) Explain Enzyme-linked immunosorbent assay with respect to principle aspects and applications.

c) Mention various mass analyser used in atomic mass spectrometer and discuss any one.

d) Discuss the working of Hallow cathode lamp.

e) A solution of sample of plant ash gave a meter reading 42. To the solution B and C containing the same quantity of unknown solution 45 and 85 mg/ml of added potassium gave meter reading of 70 and 98. Calculate the concentration of potassium in the sample.

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