Q.P. Code :04774

[Time: 2 $\frac{1}{2}$ Hours] **[Marks:075]**

Please check whether you have got the right question paper.

N.B: 1. All questions are compulsory.
2. Figures to the right indicate full marks
3. Use of log table/ non-programmable calculator is allowed.

Q 1 Answer **any three** of the following. **15**

A) Explain the following terms, with suitable example w.r.t. polarogrpahy.
1) Polarisable electrode.
2) Non-polarisable electrode.
Give any two advantages of the polarisable electrode used in polarography.

B) A 5.0 x 10^{-4} M solution of Ba^{2+} ions in 0.1M KCl gave a diffusion current of 4.1 µA. If the rate of flow of mercury drops and drop time are 1.5 mg s^{-1} & 2.5 s respectively, calculate the diffusion coefficient of Ba^{2+} ions.

C) Give the basic difference between amperometry and voltammetry. Explain the nature of amperometric titration curve when titrand and titrant both are reducible, giving suitable example.

D) In a polarogrpahic technique, a series of standard solutions containing metal ions were prepared and wave heights were measured. The results obtained were as follows.

Concentration (mM)	0.5	1.0	1.5
Wave height (mm)	32.0	64.2	95.9

An unknown solution under identical condition gave a wave height of 54.0 mm. Calculate the concentration of metal ions in the unknown solution.

E) Name any two indicator electrodes used in acid-base titrations in potentiometry. Explain the determination of equivalence point in potentionetric titrations using the graph of $\frac{\Delta E}{\Delta V}$ versus V.

F) What are the advantages and limitations of amperometric titrations?

Q 2 Answer **any three** of the following. **15**

A) Explain the use of acetic acid, lactic acid and sulfites as food preservatives.

B) Discuss the method of determination of boric acid as a preservative.

C) Explain different types of tea.

D) Give the composition of face powder. How is magnesium estimated in face powder?

E) Explain the method for analysis of lactose in milk.

F) What are the constituents of antiperspirants? Mention any three of its properties.

(TURN OVER)

Q 3 Answer **any three** of the following. **15**

A) What is the role of detector in GC? With the help of a labelled diagram, explain the working of flame ionization detector.

B) The following data was obtained on using liquid chromatographic column of 20 cm length of packing. The non-retained component appeared at 1.2 min. Components A and B were found to have retention time of 6.8 min and 12.2 min respectively. The peak width at the base for component A was 0.41 min and for component B was 1.26 min. Calculate the number of plates for each peak and the plate height for the column.

C) What is ion-exchange capacity? How is it experimentally determined for a cation exchanger?

D) Discuss the application of ion-exchange chromatography w.r.t.

i) separation of amino acids, and

ii) preparation of standard solution of an acid.

E) Compare the technique of GSC with GLC.

F) Discuss the principle of size exclusion chromatography.

Q 4 Answer **any three** of the following. **15**

A) Mention any five essential requirements of a good thermobalance.

B) With the help of a labelled diagram, explain the function of any three components of DTA instruments.

C) What is a TG curve? Discuss the TG curve for the thermal decomposition of $CaC_2O_4 . H_2O$.

D) Distinguish between TGA and DTA.

E) What are thermometric titrations? Explain the application of thermometric titration in the titration of HCl against NaOH.

F) What are the advantages and limitations of neutron activation analysis?

Q 5 A Fill in the blanks. **04**

a) Supporting electrolytes used in polargraphy are generally salts of _____metal.

b) A plot of current against DME potential is called _____.

c) _____ equation forms the basis of quantitative analysis, by polarography.

d) In potentiometric titration,_____ is measured after addition of each increment of titrant.

OR

A State true or false. **04**

p) Residual current in polarography is regarded as faradaic current.

q) A potential at which current flowing through the polarographic cell is equal to one half of the limiting value is called half wave potential.

r) A counter electrode, in three electrode system, in voltammetry is the electrode that is coupled with working electrode, but plays no part in determining the magnitude of potential being measured.

s) Potentiometric titration can be used for determination of phosphoric acid content in aerated drinks.

(TURN OVER)

Q.5 B Fill in the blanks. **04**

a) Food preservation is necessary to _____the shelf life of food.

b) _____properties are detected by the five sense organs.

c) For determination of reducing sugars in honey, by Cole's ferricyanide method,_____is used as an internal indicator.

d) The most pharmacologically active compound in coffee is _____.

OR

B State true or false. **04**

p) Few of the traditional methods of food preservation are drying, salting and pickling.

q) pH 4.6 is used as a divider between high acid and low acid foods.

r) Chicory gives bitterness to coffee.

s) Lipstick consists of an oily based material and coloring agents.

C Fill in the blanks. **04**

a) The measure of separation between two peaks in a gas chromatogram is called _____.

b) GSC separation is based on selective _____of gaseous sample on the solid stationary phase.

c) Larger the value of selectivity coefficient, _____is the affinity of ions in solution for the resin.

d) In ion-exchange chromatography, higher the concentration of ions in the solution, _____ is the exchange.

OR **04**

C State true or false.

p) In GC, resolution can be improved by decreasing the number of theoretical plates.

q) Sample port temperature in GC is kept at the boiling point of the most volatile component.

r) Weakly basic anion exchanger is used at a pH greater than 7.

s) The rate of migration of solute in GC, is independent of the volume of stationary and mobile phase.

Q.5 D Fill in the blanks. **03**

a) Neutron flux is the number of _____per square centimeter per second.

b) Al_2O_3 is most widely used _____material for DTA.

c) Thermogram obtained in thermometric titration of Ca^{+2} and Mg^{+2} against EDTA shows _____ end points.

OR

D State the true or false. **03**

p) Thermal neutrons are used to produce radioactive isotopes in NAA.

q) Physical changes taking place in the sample in DTA are generally represented by an endothermic peak.

r) Curved portion in TG curve indicates the regions of no weight loss.

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