

Post Graduate Diploma in Analytical Chemistry (PGDAC)

MARCH EXAMINATION 2021

COURSE CODE: MCHL-002 COURSE TITLE: Separation Methods Lab (Credits: 2)

Time: ½ Hour

Maximum Marks: 25

Please fill up the following particulars:

Enrolment No. in Figures

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Day and Date

Medium

Enrollment No. in Words

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(English/Hindi).....

Examination Centre Code

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Name of Examinee.....

Signature of Examinee.....

Signature of Invigilator.....

To be filled only by the Evaluator

Marks Obtained.....

Signature of the Evaluator.....

Name of the Evaluator.....

Evaluator Code:.....

Seal of Centre Superintendent
with Centre Code

Note for Examinee:

- This is an objective type question paper.
- This question paper consists of 15 questions. **You have to attempt only 10 questions.** Each question carries 2½ marks.
- Each question has four alternatives, only one of which is correct. Mark the correct alternative on the question paper itself by putting the tick mark ✓ in the box given against it.

ON COMPLETION, IT IS COMPULSORY FOR YOU TO SUBMIT THIS QUESTION PAPER TO YOUR INVIGILATOR.

- Which one of the following is used as an indicator for standardising the nickel chloride solution in the separation of Fe(III) and Ni(II) by liquid-liquid extraction ?
 - Conc. ammonia solution
 - Varian blue B
 - Murexide
 - Methyl orange

(i) (ii) (iii) (iv)
- Which one of the following is used for reducing the emulsion formation in the liquid –liquid extraction of Fe (III) and NI (II)?

- (i) Oxalic acid
- (ii) Sodium chloride
- (iii) Sodium hydroxide
- (iv) EDTA

(i) (ii) (iii) (iv)

3. Which one of the following is **not** correct for the anion exchange capacity of a strongly basic exchanger in Cl^- form ?

- (i) Mohr's titration is carried out in neutral or faintly alkaline medium.
- (ii) A faint reddish-brown colour persists at the end point.
- (iii) Silver nitrate solution is added from the burette.
- (iv) Phenolphthalein is used as an indicator.

(i) (ii) (iii) (iv)

4. Dowex 1 is a

- (i) weak acid cation exchanger.
- (ii) strong acid cation exchange.
- (iii) weak base anion exchanger.
- (iv) strong base anion exchanger.

(i) (ii) (iii) (iv)

5. Which one of the following is used for titration in the determination of metal ion content of sea water ?

- (i) 0.50 M NaOH solution
- (ii) 0.10 M NaOH solution
- (iii) 0.010 M NaOH
- (iv) 0.020 M NaOH solution

(i) (ii) (iii) (iv)

6. Which one of the following correctly represents the distribution ratio of an ion between the solution and the ion exchange resin?

(i) $K_d = \frac{\text{conc}^n \text{ of ion in 1 g resin}}{\text{conc}^n \text{ of ion in } 1 \text{ cm}^3 \text{ of solution}}$

(ii) $K_d = \frac{\text{conc}^n \text{ of ion in 10 g resin}}{\text{conc}^n \text{ of ion in } 100 \text{ cm}^3 \text{ of solution}}$

(iii) $K_d = \frac{\text{conc}^n \text{ of ion in 100 g resin}}{\text{conc}^n \text{ of ion in } 10 \text{ cm}^3 \text{ of solution}}$

(iv) $K_d = \frac{\text{conc}^n \text{ of ion in 100 g resin}}{\text{conc}^n \text{ of ion in } 1 \text{ cm}^3 \text{ of solution}}$

7. Which one of the following exhibits pink colour on reaction with ammonium sulphide in the separation using paper chromatography ?
- (i) Co^{2+}
- (ii) Ni^{2+}
- (iii) Cu^{2+}
- (iv) Mn^{2+}
8. Which one of the following is the correct order of R_f values for the given cations?
- (i) $\text{Mn}^{2+} < \text{Ni}^{2+} < \text{Cu}^{2+} < \text{Co}^{2+}$
- (ii) $\text{Ni}^{2+} < \text{Mn}^{2+} < \text{Co}^{2+} < \text{Cu}^{2+}$
- (iii) $\text{Co}^{2+} < \text{Mn}^{2+} < \text{Cu}^{2+} < \text{Ni}^{2+}$
- (iv) $\text{Cu}^{2+} < \text{Mn}^{2+} < \text{Co}^{2+} < \text{Ni}^{2+}$
9. Which one of the following is generally used as a mobile phase for the separation of amino acids?
- (i) Acetone and Water
- (ii) Ethanol and Water
- (iii) *n*-propanol and Water
- (iv) Ethyl acetate and Ethanol
10. Which one of the amino acids shows lowest R_f value when separated from a mixture using paper chromatography?
- (i) Glycine
- (ii) Valine
- (iii) Alanine
- (iv) Leucine
- (i) (ii) (iii) (iv)
11. Which one of the following is used as a spraying reagent for identifying carbohydrates in a given mixture using TLC?
- (i) 20% Aqueous trichloroethanoic acid
- (ii) 0.2% Ethanolic solution of 1,3-dihydroxynaphthalene
- (iii) 0.5% Phthalic anhydride in ethanol and Citric acid in water
- (iv) 0.2% Ethanolic solution of 1,3-dihydroxynaphthalene and 20% aqueous trichloroethanoic acid in equal volumes
- (i) (ii) (iii) (iv)
12. Which one of the following was used in the column by Mikhail Tswett for the separation of plant pigments?
- (i) Calcium oxide
- (ii) Calcium chloride
- (iii) Calcium carbonate
- (iv) Calcium sulphate

(i) (ii) (iii) (iv)

13. Which one of the following is the least polar adsorbent used in column chromatography?

- (i) Silica gel
- (ii) Charcoal
- (iii) Fuller's earth
- (iv) Alumina

(i) (ii) (iii) (iv)

14. Using column chromatography, which one of the following is used as an indicator for the analysis of iron and aluminium when titrated using EDTA?

- (i) Variamine Blue B
- (ii) 1% Hydroquinone
- (iii) Eriochrome black T
- (iv) Starch

(i) (ii) (iii) (iv)

15. In the preparation of standard EDTA solution, if a turbid solution is obtained, then which one of the following is added to obtain a clear solution?

- (i) Calcium chloride
- (ii) Hydrochloric acid
- (iii) Sodium hydroxide
- (iv) Ethanol

(i) (ii) (iii) (iv)