S-5/CEMG/DSE-IA/21

TDP (General) 5th Semester Exam., 2021

CHEMISTRY

(General)

PAPER : DSE–I (A)

Full Marks : 60 *Time* : 3 Hours

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer Question No. 1 and other four questions, taking *one* from each unit.

GROUP–A

1. Answer *any* **six** of the following questions : 2×6=12

(a) What is R_f value?

(b) What do you mean by eluent?

(c) What do you mean by absolute and relative errors?

(d) Define standard deviation.

(e) What is the most useful range of IR for structural elucidation?

(f) What is the purpose of flame in AAS?

(g) What is the difference between pH and pK_a?

(h) What is TG curve?

GROUP—B

UNIT—I

2. (a) What do you mean by precision of a measurement? How is it expressed?

(b) What are determinate and indeterminate error?

(c) What is *t*-test? Discuss its utility.

(2+2)+4+4=12

3. (a) What are the limitations of Lambert-Beer law?

(b) What is molar extinction coefficient? Mention its unit.

(c) Explain the following :

(i) Monochromator

(ii) Choice of light source

(d) Discuss the basic principle for estimation of metal ion by UV-visible spectrophotometry.

2+3+(2+2)+3=12

[Continued]

UNIT—II

4. *(a)* In which region $\left(cm^{-1}\right)$ the – OH group and $-NH_2$ group absorb IR radiation?

   (b) Write the advantage of a double beam IR spectrophotometer over a single beam IR.

   (c) Explain the basic principles of IR spectroscopy.

   (d) What are the basic components of IR spectrophotometer? Describe briefly about any one of them. 2+3+3+4=12

5. *(a)* What are the techniques adopted for estimation of trace level of iron in the water samples?

   (b) What are the sources of chemical interferences? How can it be removed?

   (c) What is atomization in AAS? Name the common method of atomization.
   3+(3+2)+(2+2)=12

UNIT—III

6. *(a)* Which properties of materials are measured by thermal analysis method? What are different methods of thermal analysis?

(b) Discuss the principle of TGA. What are the factors that influence the TGA measurement?

(c) Discuss briefly one application of TGA. 3+5+4=12

7. (a) Write the basic principle pf conductometric titration. What are the advantages of such titration?

(b) What do you mean by potentiometric titration?

(c) Discuss the method for determination of the pH of a solution using a standard electrode. 5+3+4=12

UNIT—IV

8. (a) What is chromatography? What are the basic principles of chromatographic separation?

(b) What is ion-exchange chromatography? Mention common resins used in ion exchange chromatography.

(c) What are the substances most frequently used as coating materials in TLC? Write down the application of Thin Layer Chromatography (TLC). 4+4+4=12

[Continued]

9. *(a)* What is Nernst's theorem? Write extraction process for metal chelates.

(b) Write a note on chiral HPLC analysis.

(c) Define enantiometric excess.

(d) Write down the principle of GLC.

4+3+2+3=12

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