

TDP (Honours) 5th Semester Exam., 2019

CHEMISTRY

(Honours)

PAPER - DSE - I

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.*

Group - A

1. Answer any six questions : 2×6=12

- (a) What do you mean by sampling?
- (b) Which part of the electromagnetic radiation is responsible for electronic transition of a molecule?
- (c) What is the range of the wave numbers corresponding to the stretching of C = O ?
- (d) Name two elements which are more sensitive to FAES than FAAS?

[Turn Over]

(2)

- (e) Write two factors on which TG curve depends.
- (f) What do you mean by potentiometric titration?
- (g) Give an example of selective solvent extraction of metal ion.
- (h) Write an application of ion-exchange chromatography.

Group - B

Answer *four* questions taking *one* question from each unit.

Unit - I

2. (a) How many significant figures there in each of the following numbers?
- (i) 100.01
 - (ii) 7000.001
- (b) Distinguish between accuracy and precision.
- (c) What are determinate and indeterminate errors?
- (d) What is meant by confidence interval?

$$2+4+3+3=12$$

3. (a) What is Beer-Lambert's law? Derive its mathematical expression indicating the terms used.
- (b) Why Beer's law is not valid in all concentrations?
- (c) How *cis*-and *trans*-stilbenes can be distinguished by UV-vis spectrophotometry?
- (d) Write the principle to determine the composition of metal complexes by Job's method.

$$4+2+2+4=12$$

Unit - II

4. (a) Write the advantage of a double beam IR spectrophotometer over a single beam IR.
- (b) Explain the working principle of IR spectrophotometer.
- (c) Why *KBr* pellet technique is better than *nujol* technique as sample preparation in IR spectroscopic analysis?
- (d) Write three applications of infrared spectroscopy.

$$2+4+3+3=12$$

[Turn Over]

5. (a) What is atomic emission spectroscopy? Write its basic principle.

(b) Write the differences between FAAS and FAES?
(2+5)+5=12

Unit - III

6. (a) What is thermogravimetry?

(b) What are the common sources of error in thermogravimetric analysis? How these can be avoided ?

(c) Draw the thermogravimetric curve for a mixture of $MgCO_3$ and $CaCO_3$. How the masses of Mg and Ca . Can be calculated from that curve ?

2+(3+2)+5=12

7. (a) What do you mean by conductometric titration? Write the basic principle of such titrations.

(b) What are the advantages of conductometric titration?

(c) Draw conductometric titration curves for the following and explain.

(i) KCl vs. $AgNO_3$

(ii) CH_3COOH vs. $NaOH$

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

Unit - IV

8. (a) Explain distribution law and its limitations in solvent extraction processes.

(b) What makes solvent extraction more efficient?

(c) Write the technique of counter current extraction.

$(3+2)+2+5=12$

9. (a) What is chromatography? Mention three types of chromatography. Illustrate any one with suitable example.

(b) What do you mean by stationary phase and mobile phase in chromatography?

(c) Define 'retention time' and 'retention volume' in gas chromatography.

$(2+1\frac{1}{2}+2\frac{1}{2})+3+3=12$
