**TDC (CBCS) Odd Semester Exam., 2021**
**held in March, 2022**

# CHEMISTRY

**( 5th Semester )**

Course No. : CHMDSE–501

**( Analytical Methods in Chemistry )**

*Full Marks* : 50
*Pass Marks* : 20

*Time* : 3 hours

*The figures in the margin indicate full marks for the questions*

## SECTION—A

Answer any *fifteen* from the following : 1×15=15

**1.** Define accuracy.

**2.** What is meant by sampling?

**3.** What do you mean by the term 'precision'?

**4.** What is relative error?

5. State Laporte selection rule.

6. What is meant by monochromator?

7. State Beer's law.

8. Mention a few sources of UV-light.

9. What is meant by atomization?

10. What do you mean by chemical interference?

11. What is background correction?

12. What is nebulizer?

13. What is TGA?

14. Define pH.

15. What is potentiometric titration?

16. Mention one use of TGA.

17. Define chromatography.





18. What is HPLC?

19. Define elution.

20. What is adsorbent?

## SECTION—B

Answer any *five* from the following : 2×5=10

21. What is *Q*-test?

22. In an experiment, the concentration of zinc in a given sample was found to be 20·17 ppm. Taking the accepted value as 20·00 ppm, calculate the absolute error as well as the relative error.

23. Write Lambert's law and Beer-Lambert law along with mathematical expression.

24. What is meant by sampling technique in IR spectroscopy? What are different sources of IR?

25. Distinguish between flame emission and atomic absorption spectrometry.

**26.** Discuss the principle of flame emission spectroscopy.

**27.** Discuss the principle of pH metric titration.

**28.** How will you determine the equivalence point conductometric and potentiometric titration?

**29.** What is solvent extraction? Define chelation.

**30.** Explain briefly thin-layer chromatography including its principle.

SECTION—C

Answer any *five* from the following : 5×5=25

**31.** Define errors. Discuss various types of errors citing suitable examples. 1+4=5

**32.** What is *t*-test? In an analysis of an ore, the percentages of an element were found to be 65·55, 65·90, 67·85, 66·85, 69·90 and 65·00. The value 69·90 appears to be suspect. Ascertain whether this should be retained or rejected.The *Q* critical, for six observations at 90% confidence level, is 0·56. 2+3=5



( Continued )



**33.** Discuss the basic principle and instrumentation of IR spectroscopy.

**34.** What is the difference between single-beam and double-beam instrument? Explain the Job's method for the determination of composition of coloured metal complexes. 2+3=5

**35.** Discuss various sources of interferences in AAS. Explain the removal of such interferences.

**36.** Discuss the instrumentation of AAS. Mention some uses of AAS with respect to the detection of trace elements of metal ions from water sample. 2+3=5

**37.** Discuss the instrumentation and principle involved in TGA.

**38.** Discuss the basic principle of pH metric titration of—

*(a)* strong acid vs. strong base;

*(b)* weak acid vs. strong base;

*(c)* weak acid vs. weak base

with graphs.



( Turn Over )

39. Discuss briefly adsorption, partition and ion-exchange chromatography. What do you mean by batch, counter current and continuous extraction?

40. Explain the mechanism involved in HPLC. What is meant by development of chromatogram? 3+2=5

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