CENTRAL LIBRARY N.C.COLLEGE

**TDC (CBCS) Odd Semester Exam., 2020
held in March, 2021**

CHEMISTRY

(5th Semester)

Course No. : CHMDSE–501T

(Analytic 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* questions :   1×15=15

1. What do you mean by the term 'sampling'?

2. Define error.

3. What is meant by precision?

(*Turn Over*)

(2)

4. What are different ways of expressing an error?

5. Define accuracy.

6. If p-value is exactly equal to 0·05, is it significant or insignificant?

7. What is the range of UV-visible spectroscopy?

8. State Beer-Lambert law.

9. Which lamp is used in IR-spectroscopy?

10. What is the unit of absorbance which can be derived from Beer-Lambert law?

11. What is the basic difference between single-beam and double-beam instruments?

12. Why does absorption in UV-visible spectra appear as bands not as sharp peaks?

13. What type of electromagnetic wavelength does AAS instrument use?

(Continued)

(3)

14. What is the purpose of the chopper in AAS or AES instrument?

15. What types of fuels and oxidants are used in AAS and AES?

16. What is the purpose of a slit in various locations in an instrument?

17. How does the combination of fuel gases and oxidants affect flame temperature in AAS?

18. What is nebulisation?

19. What is thermogravimetry?

20. What is pH?

21. What is cell constant?

22. What is potentiometric titration?

23. What do you mean by equivalent point of a titration?

24. What is conductometric titration?

(Turn Over)

(4)

25. Write one example of polar solvent.

26. Solvent extraction is governed by which law?

27. Fill in the blank :

Paper chromatography is an example of ——.

28. What is the basis of chromatographic process?

29. What is meant by the term 'R_f values'?

30. What is an eluent?

SECTION—B

Answer any *five* questions :   2×5=10

31. Discuss how you can minimize error.

32. A rectangular board is measured with a scale having accuracy of 0·2 cm. The length and breadth are measured as 35·4 cm and 18·4 cm respectively. Find the relative error and percentage error of the area.

(5)

33. What do you mean by selection rule in spectroscopy? Write the selection rule for the IR-spectroscopy.

34. How can you distinguish between keto-enol tautomers by UV-spectroscopy?

35. Explain the type of interference generally produced in the atomic absorption spectroscopy.

36. Explain various processes involved in flame emission spectroscopy.

37. Explain the basic principle involved in thermogravimetric analysis.

38. 184 mg of a sample of mixture of $MgCO_3$ and $CaCO_3$ is reduced to 160 mg when subjected to thermogravimetric analysis in the temperature range 480 °C–640 °C. Calculate the amount of Mg and Ca in the sample.

39. Write two advantages of chromatography over other techniques.

40. Write the principle of solvent extraction.

(6)

SECTION—C

Answer any *five* questions :   5×5=25

41. What is meant by normal distribution? Give examples. What are the characteristics of normal distribution?

42. Discuss different statistical tests of data analysis.

43. Explain how you determine the composition of metal complexes using Job's method of continuous variation.

44. Describe the basic principle and instrumentation of double-beam IR-instruments.

45. Discuss the basic principle of instrumentation of atomic absorption spectroscopy.

46. Discuss various applications of AAS.

47. Discuss the basic principle involved in the redox potentiometric titration with the help of a suitable example.

(7)

48. Discuss the basic principle involved in the pH-metric titration with suitable example.

49. Discuss various techniques of solvent extraction.

50. Discuss briefly the chromatographic separation technique.

★ ★ ★