

Reg. No. : .....

Name : .....

II Semester B.Sc. Degree (CBCSS-OBE-Reg./Sup./Imp.)  
Examination, April 2021  
(2019 Admission Onwards)  
CORE COURSE IN CHEMISTRY  
2B03CHE : Analytical and Inorganic Chemistry – I

Max. Marks : 40

Time : 3 Hours

**Instruction :** Answer the questions in **English** only.

## SECTION – A

Answer **all** questions. **Each** question carries **1** mark.

1. The number of significant figures for 0.00304 is \_\_\_\_\_
2. The total nuclear spin of ortho hydrogen is \_\_\_\_\_
3. Conjugate acid of  $\text{HCO}_3^-$  is \_\_\_\_\_
4. In the reaction,  $\text{CaO} + \text{CO}_2 \rightarrow \text{CaCO}_3$ , the Usanovich base is \_\_\_\_\_ (4×1=4)

## SECTION – B

Answer **any seven** questions. **Each** question carries **2** marks.

5. Calculate the relative error as percent for a measurement in which the observed value is 20.17 ppm and the accepted value is 20.00 ppm.
6. What is meant by systematic errors ?
7. You are provided with 100 ml 0.05 M  $\text{KMnO}_4$  solution. Using this solution, how would you prepare 50 ml of 0.002 M solution ?
8. Write any four qualities expected for a primary standard.
9. Melting point of  $\text{BeCl}_2$  is lower than that of  $\text{CaCl}_2$ . Explain.



**K21U 3457**

10. What are the reasons for the unusual behaviour of second period elements in the periodic table ?
11. What is the effect of polarization on the decomposition of alkaline earth metal carbonates ?
12.  $\text{CCl}_4$  does not undergo hydrolysis while  $\text{SiCl}_4$  is easily hydrolysed. Justify the statement.
13.  $\text{AgI}_2^-$  complex is stable but  $\text{AgF}_2^-$  is not. Why ?
14. Give the Lux-Flood definitions for acid and base.

(7×2=14)

**SECTION – C**

Answer **any four** questions. **Each** question carries **3** marks.

15. Distinguish between precision and accuracy.
16. Copper(II) is precipitated as  $\text{CuS}$  in dil.  $\text{HCl}$  medium while  $\text{Co(II)}$  is precipitated as  $\text{CoS}$  in ammoniacal medium. Explain.
17. Explain the significance of inert pair effect among group 15 elements.
18. Discuss the periodic trends in the acid-base character of oxides of p-block elements.
19. Write a note on different classes of hydrides.
20. Discuss the solvent system concept of acids and bases.

(4×3=12)

**SECTION – D**

Answer **any two** questions. **Each** question carries **5** marks.

21. Describe F-test and t-test for an analytical measurement.
22. Write a note on EDTA titrations.
23. i) Arrange the four oxoacids of chlorine in the increasing order of their acid strength and explain.  
ii) Compare the Lewis acidity of Boron trihalides and explain.
24. Explain HSAB principle. Discuss its applications.

(2½+ 2½)

(2×5=10)



K20U 0457

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SECTION – A

Answer **all** questions. **Each** question carries **1** mark.

1. Concordance of the observed value and the true value in an analysis is called
2. Among  $\text{PbCl}_2$  and  $\text{PbCl}_4$ , which is largely ionic in nature ?
3. The conjugate base of HCl is
4. According to Lux-Flood concept, the substance which accepts the oxide ion is  
(4×1=4)

SECTION – B

Answer **any seven** questions. **Each** question carries **2** marks.

5. Evaluate the given expression rounding off the answer to the appropriate number of significant figures :  $64.36 \text{ g} + 1.346 \text{ g} + 4.0 \text{ g}$ .
6. What is meant by confidence limit ?
7. Calculate the mass of NaOH in 500 ml of its 0.5 M solution.
8. What is meant by common ion effect ? Explain with an example.
9. Discuss the general periodic trends in the acid-base character of oxides of p-block elements.

P.T.O.



10. The boiling point of  $\text{NH}_3$  is abnormally high. Why ?
11. Aluminium is more metallic than Silicon. Explain.
12. Arrange  $\text{HClO}_2$ ,  $\text{HClO}_3$ ,  $\text{HClO}_4$  and  $\text{HOCl}$  in the increasing order of acid strength. Justify your answer.
13. Ammonium chloride is an acid in liquid ammonia according to solvent system concept. Explain.
14. Define acids and bases, according to Lewis concept. (7×2=14)

## SECTION – C

Answer **any four** questions. **Each** question carries **3** marks.

15. Describe the Q-test for rejecting the result of an analysis.
16. What is meant by redox indicators ? What are the potential requirements for a redox indicator ?
17. Write a note on inert pair effect.
18. Distinguish between ortho and para hydrogen. How does their ratio vary with temperature ?
19. Compare the Lewis acidity of Boron trihalides and explain.
20. Describe levelling effect with a suitable example. (4×3=12)

## SECTION – D

Answer **any two** questions. **Each** question carries **5** marks.

21. Explain any three types of systematic errors. How can these errors be corrected ?
  22. Discuss the theory of acid-base indicators using methyl orange and phenolphthalein as examples.
  23. Write a note on different classes of hydrides of representative elements.
  24. Explain HSAB principle. Discuss its applications. (2×5=10)
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