

0035005

K19P 1478



Reg. No. :

Name :

I Semester M.Sc. Degree (CBSS-Reg./Supple./Imp.)

Examination, October - 2019

(2014 Admission Onwards)

CHEMISTRY

CHE 1C 02 : INORGANIC CHEMISTRY-I

Time : 3 Hours

Max. Marks : 60

SECTION-A

Answer **All** questions in **one** word or **one** sentence. Each question carries 1 mark. (8×1=8)

1. Define standard deviation.
2. Differentiate between precision and accuracy.
3. Identify the conjugate acids of C_5H_5N and $[Co(CO)_4]^-$
4. Arrange the following species in the increasing order of acid strength : BF_3 , BCl_3 , BBr_3
5. Define nuclear reaction cross section.
6. What is the significance of 'Q-values' in nuclear reactions?
7. What is 'inorganic graphite'?
8. How is S_2N_2 prepared?

SECTION-B

Answer any **Eight** questions. Answer may be in **Two** or **Three** sentences. Each question carries **2** marks. (8×2=16)

9. Explain the significance of Least Square Analysis in the evaluation of analytical data.
10. Draw the titration curve for the titration of EDTA with $ZnSO_4$ solution and explain.
11. Calculate the standard deviation and relative standard deviation for the following set of analytical data for a sample X:
7.12, 7.15, 7.11, 7.16, 7.18

P.T.O.



12. Which is more acidic; H_2CrO_4 or HMnO_4 ? Justify your answer.
13. Prove that all Bronsted bases may not be Arrhenius bases.
14. What is Lux concept of acids and bases?
15. How breeder reactor differs from nuclear reactor?
16. How the average life of a radioactive element is related to its disintegration constant?
17. There is a steady level of ^{14}C ($t_{1/2} = 5740$ years) in the atmosphere corresponding to 16.1 disintegrations $\text{min}^{-1}\text{g}^{-1}$. Calculate the ratio of $^{14}\text{C}/^{12}\text{C}$ in the atmosphere.
18. Classify the following compounds into *closo*, *nido* and *arachino* structures:
 B_5H_9 , $\text{C}_2\text{B}_{10}\text{H}_{12}$, B_4H_{10} , $\text{C}_3\text{B}_3\text{H}_5\text{Fe}(\text{CO})_3$
19. What is the action of the following compounds on diborane?
a) CO
b) $(\text{CH}_3)_2\text{O}$ Give equation.
20. How is tetrasulphur tetranitride prepared? Comment on the thermochromism exhibited by this compound.

SECTION-C

Short paragraph questions. Answer any **Four** questions. Each question carries **3** marks. (4×3=12)

21. In the extraction of cerium(IV) with 2-thenoyltrifluoroacetone in benzene the distribution ratio was 999. If the volume of the organic phase was 20ml and that of aqueous phase was 50ml, what was the percentage of extraction?
22. Explain selective masking and demasking technique in EDTA titrations, citing examples.
23. Arrange the conjugate acids of SiO_4^{4-} , PO_4^{3-} , SO_4^{2-} and ClO_4^- in the decreasing order of acidity. Give reasons for your answer.
24. Arrange the following oxides in the increasing order of their basicity: B_2O_3 , Al_2O_3 , BaO , Cl_2O_7 , CO_2 and SO_3 . Substantiate.
25. Describe the principle involved in the working of a GM counter.
26. Briefly discuss the shell model of nucleus.



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27. Describe the synthesis, structure and properties of polythiazyl.
28. What are the different types of hydrogen atoms present in carboranes. Arrange them in the increasing order of acidity.

SECTION-D

Essay type questions. Answer **four** questions. Each question carries 6 marks.

(4×6=24)

29. a) Critically evaluate different types of solvent systems and their applications in solvent extraction technique.
- (OR)
- b) Give an account of EDTA titrations, giving special emphasis to the theory different types of EDTA titrations, indicators used and the advantages.
30. a) Discuss the theoretical basis of classification of Lewis acids and bases into hard and soft acids and bases. How this classification is useful in the study of coordination compounds?
- (OR)
- b) Give an account of the important reactions that take place in liquid ammonia. What are the advantages and disadvantages of using liquid ammonia as a non-aqueous solvent.
31. a) Describe the principle involved in the working of PWR and BWR.
- (OR)
- b) Describe the principle and experimental set up involved in Fricke dosimeter. What is the procedure for determining absorbed dose using it?
32. a) Give any one method for the preparation of triphosphonitric chloride. Discuss the important reactions and structure of this compound.
- (OR)
- b) Discuss the importance of icosahedral framework of boron atoms in boron chemistry, giving examples.
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