Reg. No.:....

Name:.....



K19P 1478

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.
- Identify the conjugate acids of C<sub>5</sub>H<sub>5</sub>N and [Co(CO)<sub>4</sub>]
- Arrange the following species in the increasing order of acid strength: BF<sub>3</sub>, BCl<sub>3</sub>, BBr<sub>3</sub>
- 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<sub>2</sub>N<sub>2</sub> prepared?

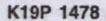
### SECTION-B

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<sub>4</sub> 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; H2CrO4 or HMnO4? 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 <sup>14</sup>C(t<sub>y2</sub> = 5740 years) in the atmosphere corresponding to 16.1 disintegrations min<sup>-1</sup>g<sup>-1</sup>. Calculate the ratio of <sup>14</sup>C/<sup>12</sup>C in the atmosphere.
- 18. Classify the following compounds into closo, nido and arachino structures:

B<sub>5</sub>H<sub>9</sub>, C<sub>2</sub>B<sub>10</sub>H<sub>12</sub>, B<sub>4</sub>H<sub>10</sub>, C<sub>3</sub>B<sub>3</sub>H<sub>5</sub>Fe(CO)<sub>3</sub>

- 19. What is the action of the following compounds on diborane?
  - a) CO
  - b) (CH<sub>2</sub>)<sub>2</sub>O Give equation.
- 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. (4x3=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?
- Explain selective masking and demasking technique in EDTA titrations, citing examples.
- 23. Arrange the conjugate acids of SiO<sub>4</sub><sup>4-</sup>, PO<sub>4</sub><sup>3-</sup>, SO<sub>4</sub><sup>2-</sup> and CLO<sub>4</sub><sup>-</sup> in the decreasing order of acidity. Give reasons for your answer.
- 24. Arrange the following oxides in the increasing order of their basicity: B<sub>2</sub>O<sub>3</sub>, Al<sub>2</sub>O<sub>3</sub>, BaO, CL<sub>2</sub>O<sub>7</sub>, CO<sub>2</sub> and SO<sub>3</sub>. 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.

(3)

#### 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)

- 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 or 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 triphosphonitrilic chloride. Discuss the important reactions and structure of this compound.

# (OR)

 Discuss the importance of icosahedral frame work of boron atoms in boron chemistry, giving examples.