

C 32418

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Name.....

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, DECEMBER 2017

(CUCSS)

Chemistry

CH 1C 02—ELEMENTARY INORGANIC CHEMISTRY

(2015 Admissions)

Time : Three Hours

Maximum : 36 Weightage

Part A

Answer all questions.

Each question carries 1 weightage.

1. Draw the resonating structures for :
 - (i) POCl_3
 - (ii) N_2O .
2. Compute the formal charges in the compound Q_P and Q_H in PH_3 .
3. Classify the following on Lewis acid or Lewis base with reasoning :
 - (i) Cl^-
 - (ii) Ti^{4+} .
4. Do you expect $(\text{CH}_3)_2\text{SO}$ to bind with H^+ through S or O ?
5. Classify the compounds according to Wades' rule :
 - (i) B_6H_{10} .
 - (ii) $\text{C}_2\text{B}_9\text{H}_{11}^{2-}$
6. Give the synthesis of diborane.
7. Suggest a method for the synthesis of alumino silicates.
8. Complete and balance the following reaction $[\text{PnCl}_2]_3 + \text{excess Me}_2\text{NH} \rightarrow$
9. Account for the broadening of spectral lines in lighter actinides.
10. Suggest reason for the variation of magnetic moment values obtained for Eu^{3+} .
11. How many number of α and β particles are ejected in the radioactive decay ?
$${}^{235}\text{X}_{92} \rightarrow {}^{215}\text{Y}_{85}$$
12. Find out the nuclide A formed in the nuclear reaction of ${}^{10}\text{B} (\alpha, \text{u}) \text{A}$.

(12 × 1 = 12 weightage)

Turn over

Part B

*Answer any eight questions.
Each question carries 2 weightage.*

13. Predict the structure of the following by applying VSEPR theory : (i) XeOF_4 . (ii) SF_4 . (iii) ICl_2^- .
14. Write briefly on van der Waals' forces.
15. The order of acidity of boron halides in $\text{BF}_3 < \text{Bcl}_3 < \text{BBr}_3$. In there anything unexpected in the order. Suggest possible explanation.
16. Account on the term symbiosis.
17. Derive the styx code for B_5H_9 and draw its structure.
18. Compare and contrast the properties of N and P compounds.
19. How are following compounds prepared ?
 - (i) $\text{N}_3\text{S}_3\text{Cl}_3$.
 - (ii) $\text{N}_3\text{S}_3\text{F}_3$.
 - (iii) $\text{Cl}_3\text{S}_3\text{O}_3\text{N}_3$.
20. Give an account on phosphazene polymers.
21. What are Latimer diagram ? Illustrate.
22. Describe the magnetic properties of lanthanides. In what way they differ from transition elements.
23. Illustrate the applications of nuclear shell model with two examples.
24. Differentiate between photo nuclear and thermo nuclear reactions.

(8 × 2 = 16 weightage)

Part C

*Answer any two questions.
Each question carries 4 weightage.*

25. Construct and discuss the molecular orbital diagram of BeH_2 molecule.
26. Compare and contrast the chemistry of Borazine with benzene derivatives.
27. Detail the chemistry of uranyl compounds.
28. Explain the theory of nuclear fision reaction highlighting the concept of critical size.

(2 × 4 = 8 weightage)