

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

SECOND YEAR [2016-19]

B.A./B.Sc. THIRD SEMESTER (July – December) 2017

Mid-Semester Examination, September 2017

Date : 13/09/2017

CHEMISTRY (General)

Time : 12 noon – 1 pm

Paper : III

Full Marks : 25

Answer **any five** of the following :

[5×5]

1. a) Explain why acidity of HClO_x increases as x increases from 1 to 4. [2]
b) Neither BrF_5 nor AsF_5 are good conductor of electricity, but a mixture of the two makes a good conductor. Why? [1]
c) Arrange the following hydrogen halides, HF, HCl, HBr and HI on the basis of their acidity, providing with a logical explanation. [2]
2. a) Describe shape of the following molecules in vapour state— ClF_3 , BrF_5 , ICl_4^- . What is the probable hybridization of the central atom in each case? [3]
b) Electronegativity of fluorine, according to Pauling Scale is 4.0 which is higher than Chlorine, 3.2. However, Electron affinity of Cl is higher (–349 kJ/mol) than that of F (–333 kJ/mol). Comment on this apparent anomaly. [1]
c) An interhalogen of XY_n type where $X = \text{F}$, $Y = \text{Br}$ and $n \geq 3$ is highly unlikely to form. What could be the reason? [1]
3. a) What are the reasons behind the high reactivity of fluorine compared to other halogens? [2]
b) Why at ambient condition, all group 18 elements, from He to Ne are gaseous and notoriously difficult to solidify? [2]
c) Suggest the most suitable noble gas for (i) a very low temperature liquid refrigerant (ii) an electric discharge light source with low ionization energy. [1]
4. a) Why XeF_6 is so dangerous to work with in the presence of water as well as in silicate glass vessel? [2]
b) Draw the structure of XeF_2 , XeF_6 and XeO_2F_2 in their gaseous state. [3]
5. How can you prepare diborane, B_2H_6 ? Give structure and bonding of B_2H_6 . [2+3]
6. Write short notes on—
i) Inorganic rubber
ii) Hydrazine [2×2.5]
7. a) How can you prove that hydroxyl amine can serve both as a oxidising and reducing agent? [2+2]
b) Why small amount of glue or gelatine is added during the preparation of hydrazine? [1]
8. a) How can you prepare chloro-phosphazenes? [2]
b) Explain with example the symmetrical and unsymmetrical cleavage of B_2H_6 . [1.5+1.5]

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