e) First ionization energy of some elements :

Element	First Ionization energy (kJ/mol)
F	1681
Cl	1256
Br	1143
I	1009
H	1311

Considering the above data explain why H^+ is readily available whereas halogen (X^+) ion is not.

INTER B.SC. EXAMINATION, 2018

(2nd Semester)

CHEMISTRY (SUBSIDIARY)

PAPER - VIIIS

Time : Two hours Full Marks : 50

Use a separate answerscript for each group

GROUP -A

1. a) Briefly discribe schematically the basic features in the potential energy diagrams associated with physisorption and chemisorptions processes. 3

   b) The collision flux for a gaseous system of particles with mass, m at temperature, T and pressure, P is given by, $\left[P/\left(2\pi m k_B T\right)^{\frac{1}{2}} \right]$. Estimate the time for 15% atomic sites of a substrate (with 1.0×10^{19} atmos/m^2) being covered with N_2 gas moleculea at 298K when the pressure is $0.4\,\mu Pa$ and the sticking probability is 0.65. 3

   c) State the associated assumptions and derive Langmuir adsorption isotherm. Comment on the dependence of coverage of adsorbed layer at high and low pressure regions. 3

2. a) Write short notes on ***(any two)*** : $1\frac{1}{2}\times2$

(i) Peptisation, (ii) Sol-protection, (iii) Hardy-Schultz Rule

b) Describe Freundlich adsorption isotherm and state the significance of the associated parameters. 2

c) Describe the phenomena of electrophoresis in colloidal solutions and name two of its applications. 3

GROUP -C

6. Write notes on ***(any one)*** : 4×1

a) Silicones

b) Hydrogen peroxide

7. Answer ***any four*** questions : 4×3

a) F has abnormally low bond energy.....explain.

Elements	Bond energy (kJ/mol)	Bond length X_2(Å)
F	126	1.43
Cl	210	1.99
Br	158	2.28
I	118	2.66

b) Give Example of (i) pseudohalide ion, (ii) neutral oxide, (iii) amphibole, (iv) One oxoacid of sulfur from peroxoacid series, (v) interstitial carbide and (vi) nitrogen compound where oxidation state of nitrogen is-II.

c) Discuss about hysrolysis of NCl_3 and PCl_3.

d) Ammonia is more basic than phosphine...explain.

b) Answer ***any one*** of the following questions :

i) Write expected product with mechanism when D-glucose is treated with excess phenylhydrazine.

ii) Convert D-threose to the next higher aldose. 3