GROUP - C

4. a) Write down the structures of the following compounds

   i) XeF_6 ii) XeF_2 iii) XeO_4 iv) $XeOF_4$ 2

   b) Which one between BBr_3 and BCl_3, is more acidic and why ? 3

   c) Cite an example of each class of boron hydrides. Write down short note on B_2H_6. 2+3

   d) Write down the structures of

   i) 15-crown-5 and (ii) [2.2.2] cryptand 1

   e) What is electride ? Discuss with an example. 2

   f) Write a short note on Beryllium chloride. 3

Ex/Int/CH/VIS/19/2017

INTER B. SC. EXAMINATION, 2017

(1st Semester)

CHEMISTRY (SUBSIDIARY)

PAPER - VIS

Time : Two hours Full Marks : 50

Use a separate answerscript for each group.

GROUP - A

1. a) State & explain Henry's law. 2

   b) The vapour pressure of two pure liquids A and B are 15000 and 30000 Nm^{-2} at 298 K. Calculate the mole fraction of A and B in vapour phase when an equi-molar solution of the liquids is made. 3

   c) How can you explain depression of freezing point of a dilute solution ? 2

   d) Osmotic pressure of a solution containing 7 gram of dissolved protein per 100 cm^3 of a solution is 25 mm of Hg at 310 K. Calculate the molar mass of the protein. ($R=0.0825$ litre atm deg^{-1} mol^{-1}). 2

2. a) Give the labeled phase diagram of water system and briefly discuss the salient points. Calculate the number of degree of freedom at the triple point. 3

b) The vapour pressure of water at 95°C is found to be 634 mm. What would be the vapour pressure at a temperature of 100°C ? The heat of vapourisation in this range of temperature may be taken as 40593 J mol^{-1}. 3

c) Derive Nernst distribution law from thermodynamic consideration. 2

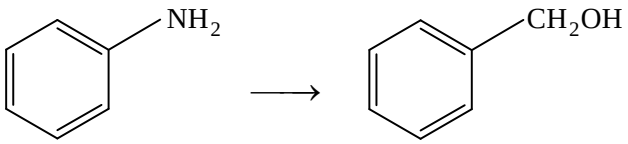
GROUP - B

3. a) A student in the chemistry practical class dissolved aniline in chloroform, added few KOH beads to it and heated on a water bath. Suddenly, everybody in the class including the student had to run away. Why ? Explain this chemical reaction with mechanism. 1+2

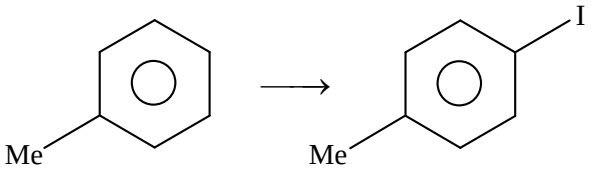
b) How can you accomplish the following transformations ? (Only steps with reagents are required, no mechanism is necessary) 1+2+2

i) $RCH_2CH_2I \longrightarrow RCH_2CH_2NO_2$

ii)



iii)



c) What happens when MeCN is boiled with a concentrated aqueous solution of KOH ? Explain with mechanism. 2

d) How can one determine the concentration of a coloured compound in a solution using UV-vis spectroscopic technique ? 2

e) Distinguish the following compounds with UV spectroscopy. $1\frac{1}{2}$

$CH_2 = CH_2$ and $CH_2 = CH - CH = CH_2$

f) Logically suggest whether CO_2 is IR active or not. 2

g) Distinguish the following compounds with IR spectroscopy. $1\frac{1}{2}$

CH_3CN and CH_3COCH_3