

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: I MSc
BRANCH: CHEMISTRY

SEMESTER : III
SESSION : MO/2022

SUBJECT: CH201R1 INORGANIC CHEMISTRY-II

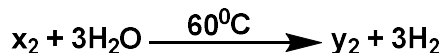
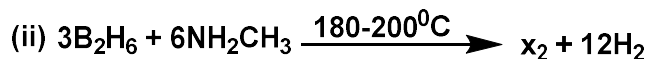
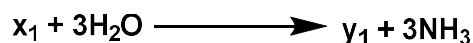
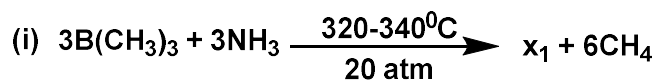
TIME: 3:00 Hours

FULL MARKS: 50

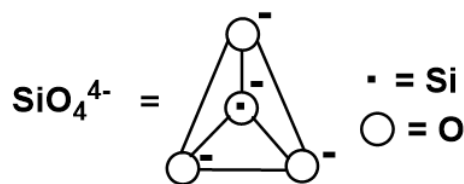
INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Identify the structure of x_1 , y_1 , x_2 , and y_2 in the following reactions. Marks [2] CO BL
CO5 2



- Q.1(b) Write the reactions for the following transformation and identify the structure of product/(s) [3] CO5 2
- (i). Hydrolysis of *cyclic-tetra*-phosphonitrilic chloride
 - (ii). Ammonolysis of *cyclic-tri*-phosphonitrilic chloride
 - (iii). The reaction of *cyclic-tri*-phosphonitrilic chloride with 1,2-dihydroxybenzene
- Q.1(c) Silicate minerals are rock-forming minerals made up of silicate groups. The building block of silicate minerals is the silica tetrahedron, represented by the chemical formula SiO_4^{4-} . The SiO_4^{4-} is represented by the following diagram. [5] CO5 3



Follow the pictorial representation of the SiO_4^{4-} unit, and draw the structure of i) *cyclic*- $(SiO_3)_3^{6-}$ and ii) *cyclic*- $(SiO_3)_6^{12-}$ silicate units.

- Q.2(a) Explain the Hall-Heroult process for the isolation of Aluminium metal. [2] CO1 2
- Q.2(b) Outline the principles of refining metals by the following methods: [3] CO1 1
- i. Refining of Titanium by electrolytic Kroll Process
 - ii. Vapour Phase refining of Nickel and Zirconium
- Q.2(c) Explain- All Bronsted acids are Lewis's acids, but all Bronsted bases are not Lewis's bases. [5] CO2 3
- Q.3(a) Explain - Li can't form alum, but Na can do. [2] CO3 1
- Q.3(b) With example briefly discuss the salient features of nuclear spin isomerism [3] CO3 2
- Q.3(c) From the Born Haber type cycle for the formation of proton and hydride from gaseous hydride H_nX , write the expression for the heat of formation of proton and hydride. [5] CO3 3

PTO

Q.4(a)	Why the electrical conductance of Sodium in liquid ammonia first decreases, then increases?	[2]	CO4	1
Q.4(b)	Solubility on alkali metal fluorides and iodide in water is opposite - Explain.	[3]	CO4	2
Q.4(c)	Write short note on Cryptand.	[5]	CO4	3
Q.5(a)	Instead of having unpaired electron, GaX ₂ is diamagnetic - Explain	[2]	CO3	1
Q.5(b)	Draw the structure and bonding in diborane.	[3]	CO4	2
Q.5(c)	With example discuss the Inert Pair Effect.	[5]	CO3	3

::::22/11/2022::::E