BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO/2024)

CLASS: BSc **SEMESTER : 1st**
BRANCH: Chemistry **SESSION : MO/2024**

SUBJECT: CH121 BASIC CHEMISTRY-I

TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	Graphically illustrate and briefly discuss the isotherm of real gases	[3]	2	2
Q.1(b)	What is Boyle Temperature? Briefly discuss.	[2]	2	2
Q.2(a)	Derive an expression for the most probable speed of gas molecules.	[3]	2	2
Q.2(b)	Express the Van der Walls equation in terms of the virial equation.	[2]	1	1
Q.3(a)	Calculate the molecular diameter of helium from the following given value: b=24 cm^3 mol^{-1}	[2]	2	2
Q.3(b)	Calculate the fraction of N_2 molecules at 101.33 kPa and 300K whose speed are in the range u_{mp}-0.005u_{mp} and u_{mp}+0.005$u_{mp.}$ (mp= most probable speed)	[3]	2	2
Q.4(a)	Calculate formal charge on each atom of hydrazine molecule.	[2]	2	1
Q.4(b)	Draw the structure and orbital picture of the following: CH_2=C=CH_2, $[CoF_6]^{3-}$, CH2=CH-CHO	[3]	2	2
Q.5(a)	All the C-O bond lengths are same in carbonate anion, whereas they are different in carbonic acid-Explain.	[2]	2	2
Q.5(b)	Molecular orbital diagram of N_2 and O_2 are different, although both are 2^{nd} period elements. Explain with suitable MO diagram	[3]		2

:::::21/10/2024 E:::::