BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO/2023)

CLASS: BSc. **SEMESTER: I**
BRANCH: CHEMISTRY **SESSION: MO/2023**

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

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Q.1(a)	What is real gas? How they are different from ideal gas?	[2]	1	2
Q.1(b)	Write down the postulates of kinetic theory of an ideal gas.	[3]	1	1
Q.2(a)	Draw and explain the Amagat's plot of compressibility factor against pressure for real gases.	[2]	1	1
Q.2(b)	Derive the Van der Waals equation from volume and pressure correction of ideal gas equation.	[3]	1	1
Q.3(a)	Draw the resonance structures of nitrate anion.	[2]	2	2
Q.3(b)	Compare the strength of acidity between phenol and *p*-nitro phenol.	[3]	2	2
Q.4(a)	Arrange the following carbocations according to their stability (a) $Ph_3 C^+$ (b) $CH_3 CH_2^+$ (c) $(CH_3)_2 CH^+$ (d) $CH_2 = CH - CH_2^+$	[2]	2	2
Q.4(b)	Explain the nature of C-C bond in ethane and ethene.	[3]	2	1
Q.5(a)	Explain the hybridization of carbon atom in acetylene.	[2]	2	1
Q.5(b)	Assuming ideal gas behavior, the density of O_2 gas at 300 K and 1.0 atm is _____ g L^{-1}. [R = 0.082 L atm mol^{-1} K^{-1}, molar mass of O_2 = 32]	[3]	1	3

:::::13/10/2023:::::