

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

CLASS: BSC
BRANCH: CHEMISTRY

SEMESTER : III
SESSION :MO/2025

SUBJECT: CH222 BASIC CHEMISTRY IV

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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		CO	BL
Q.1(a)	Define a commutator.	[2] 1	1
Q.1(b)	Show that the stationary state wave-function is time-dependent, but the corresponding probability does not depend on time.	[3] 1	4
Q.2(a)	Discuss black-body radiation.	[2] 1	1
Q.2(b)	Derive the expression for the average energy per oscillator using Planck's quantum theory.	[3] 1	2
Q.3(a)	What is a set of orthonormalized basis functions?	[2] 1	2
Q.3(b)	Obtain the energy expression for a particle of mass m, constrained to move inside a 1-D box of length l.	[3] 1	3
Q.4(a)	Why the Stetter reaction is considered a 1, 4-conjugate umpolung addition?	[2] 2	2
Q.4(b)	Describe the mechanism and key features of MPV reduction.	[3] 2	2
Q.5(a)	Discuss any two method of preparation of carbonyl compound .Show the reaction also.	[2] 2	2
Q.5(b)	Explain the mechanism of metal hydride reduction using Lithium Aluminium Hydride (LiAlH ₄). How does it differ from Sodium Borohydride (NaBH ₄)?	[3] 2	2

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