

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO2022)

CLASS: IMSC
BRANCH: CHEMISTRY

SEMESTER: 1ST
SESSION: MO/2022

SUBJECT: CH103R1 INORGANIC 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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	Marks	CO	BL
Q.1(a) A tennis ball of mass 6.0×10^{-2} Kg is moving with a speed of $m\ s^{-1}$. Calculate the wavelength associated with this moving tennis ball. Will the movement of this ball exhibit a wave character? ($h = 6.63 \times 10^{-34}$ kg $m^2\ s^{-1}$)	[2]	CO1	2
Q.1(b) Discuss the significance of Heisenberg's uncertainty principle.	[3]	CO1	2
Q.2(a) What is the significance of magnetic quantum number (m_l).	[2]	CO1	2
Q.2(b) The wavelength of first spectral line in the Balmer series is 6561Å. Calculate the wavelength of the second spectral line in Balmer series.	[3]	CO1	1
Q.3(a) Discuss the physical significance of wave function.	[2]	CO1	1
Q.3(b) What is radial probability distribution functions? Draw radial probability distribution function for 1s and 2s orbital.	[3]	CO1	2
Q.4(a) Explain the concept of hybridization.	[2]	CO4	1
Q.4(b) Predict the structure and hybridization of central element for: i) PCl_3 ; ii) SF_4 ; iii) XeF_2 ; iv) $XeOF_2$; v) PCl_3F_2 ; vi) CO_2	[3]	CO4	2
Q.5(a) What are the geometrical arrangements of sp^2 , sp^3 , sp^3d^2 , and dsp^2 hybrid orbitals?	[2]	CO4	2
Q.5(b) Discuss the mixing of atomic orbital in formation of non-equivalent hybrid orbitals in sp^3d and sp^3d^3 hybridization.	[3]	CO4	3

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