BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2025)

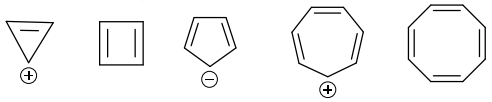
CLASS: IMSC **SEMESTER: IV/ADD**
BRANCH: MATHEMATICS **SESSION: SP/2025**

SUBJECT: CH213 CHEMISTRY II

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)	Elaborate Maxwell's distribution of molecular velocity of gas molecules with relevant mathematical expressions and graphical representations.	[2]		
Q.1(b)	Derive the mathematical expression for 'most probable velocity' of gas molecules from Maxwell's distribution of molecular velocity.	[3]		
Q.2(a)	Discuss the Laminar and Turbulent flow of fluids with clear schematics.	[2]		
Q.2(b)	Derive the Clausius-Clapeyron equation of temperature dependance of vapor pressure.	[3]		
Q.3(a)	Discuss the experimental basis of 'Arrhenius theory' of electrolytic dissociation.	[2]		
Q.3(b)	Derive 'Ostwald's law of dilution' from Arrhenius theory of dissociation of electrolyte.	[3]		
Q.4(a)	Elaborate the relationship between pH, pOH & pKw for neutral acidic and alkaline solutions.	[2]		
Q.4(b)	The ionic product of water at 100°C is 55 times that at 25°C. Calculate the value of pH of pure water at 100°C.A given solution at 100°C has a pH of 5.0. Indicate whether the solution is acidic, alkaline or neutral.	[3]		
Q.5(a)	The heat of hydrogenation of 1,3-cyclohexadiene (-55.6 kcal/mol) is almost twice that of cyclohexene (-28.8 kcal/mol); whereas it is only -49.8 kcal/mol for benzene in spite of having three triple bonds. Why?	[2]	3	II
Q.5(b)	Identify and explain the aromaticity, non-aromaticity and anti-aromaticity nature of the following molecules.	[3]	3	III



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