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

CLASS: IMSC **SEMESTER : IX**
BRANCH: CHEMISTRY **SESSION: MO/2024**

SUBJECT: CH506 ADVANCED ELECTROCHEMISTRY

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Write down the Butler-Volmer equation when mass transfer effects are eliminated. What is the transfer coefficient associated with Butler-Volmer expression?	[5]	1	II
Q.1(b)	Derive the Tafel constants from Butler-Volmer equation at large overpotential.	[5]	1	II
Q.2(a)	What is corrosion phenomenon? What are the different types of corrosion? Explain the thermodynamic aspects of corrosion process.	[5]	2	I
Q.2(b)	Through Pourbaix diagram explain immunity, corrosion and passivity domains of Fe-H_2O system at 25 °C.	[5]	2	III
Q.3(a)	Discuss the principle of polarographic analysis. What are the applications of polarographic analysis?	[5]	3	II
Q.3(b)	Discuss the principle of cyclic voltammetry along with the suitable example of a reversible & irreversible system.	[5]	3	II
Q.4(a)	Briefly discuss the principle of electrochemical impedance spectroscopy. What information are obtained from Nyquist plot?	[5]	4	III
Q.4(b)	What is chronoamperometry? What can chronoamperometry be used for?	[5]	3	II
Q.5(a)	What is fuel cell? Explain the working principle of alkaline fuel cell.	[5]	5	II
Q.5(b)	Explain the structure and working principle of Li-ion batteries.	[5]	5	II

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