Sanjay Ghodawat University, Kolhapur

2020-21

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

EXM/P/09/00

Year and Program: **2020-21, S. Y. M.Sc.**	**School of Science**	**Department:** **Chemistry**
Course Code: **CHS-621**	**Course Title: Electrochemical Methods of Analysis**	**Semester : III (Odd)**
Day : Wedneday **Date : 23.12.2020**	**End Semester Examination**	**Time : 2 Hrs.** **Max Marks : 50**

Instructions: 1) All Questions are compulsory.
2) Use of log table and scientific calculator is allowed

		Marks	BL	CO
Q.1	**Answer the following (any Two)**–			
a)	What is the half wave potential? Discuss differential and half height method for determination of half wave potential of an electrolyte.	8	L-3	CO-1
b)	i) Explain the terms residual current, limiting current and diffusion current. ii) In a polarography estimation of limiting current measured is 27.15 A when concentration of Pb^{++} was 3 milli Molar. An unknown solution of Pb gives limiting current of 13.65 A. Calculate unknown concentration.	8	L2	CO-1
c)	Draw a typical cyclic voltammogram and explain determination of peak potentials and peak currents of an electrolyte. Determine how the number of electrons involved in redox couple from the results obtained in CV?	8	L3	CO-2
Q.2	**Answer the following (any two) –**			
a)	i) Write the Ilkovic equation and give the significance of the terms involved in this equation. Explain importance of this equation in quantitative analysis of an electrolyte. ii) Diffusion current at a dropping mercury electrode for an aqueous Mg(II) solution of concentration 'c' moles per litre is 300 A If 'C'	8	L4	CO-2

is increased by 0.1 mol per litre the diffusion current increases to 900 A. Calculate the concentration 'C' in moles per litre.

b)	Give the principle underlying electrogravimetry. With suitable schematic diagram of experimental set up describe working of electogravimetry technique.	8	L-3	CO-3
c)	What is electrophoresis? Describe capillary electrophoresis technique used in chemical analysis.	8	L-3	CO-4

Q.3 Answer the following (any two) –

a)	Draw circuit diagram of cyclic voltametry and explain functions of various components of this instrument.	9	L-3	CO-2
b)	What are coulometric titrations? Discuss ion mediated coulometric neutralization titration of hydrochloric acid.	9	L-4	CO-3
c)	i) What is elecro-osmosis? Discuss application electro-osmosis for the de-watering of soil with the suitable schematic diagram. ii) In an electrophoretic mobility experiment it is observed that a colloid moves towards a negative electrode a distance of 3.82 cm in 60 minutes when the potential gradient is 2.10 volt per cm. Calculate the electrophoretic mobility of the colloid.	9	L-4	CO-4