

TABLE OF CONTENTS

Topic	Page
Abstract	i-iii
Preface	iv
Acknowledgment	v
Table of Contents	vi-ix
List of Tables	x-xi
List of Figures	xii-xx
List of Appendices	xxi
CHAPTER I : General Introduction	1-33
1.1. Introduction	1-2
1.1.1. Surfactants	2-7
1.1.2. Shape of micelle	7-9
1.1.3. Critical micelle concentration (CMC)	9-11
1.1.4. Factors influencing CMC	11-16
1.1.5. Polyelectrolyte and its classification	16-17
1.1.6. Dye and its classification	17-19
1.1.7. Dye solubilization	19-21
1.1.8. Surfactant-Polyelectrolyte interaction	21-22
1.1.9. Surfactant-Polyelectrolyte-Dye interaction	22-24
1.1.10. Present Investigation	25-26
1.1.11. Objectives of the present research work	26-28
References	29-33
CHAPTER II : Literature Review	34-47
2.1. Literature Review	34
2.1.1. Pertinent Literature Review	34-45
References	46-47
CHAPTER III : Experimental Section	47-58
3.1. Experimental Section	48
3.1.1. Materials	48-53
3.1.2. Solvents	53-54
3.2. Experimental Methods	54

3.2.1. Conductivity Measurement	54-55
3.2.2. UV-visible Spectra Measurement	55-56
3.2.3. Surface Tension Measurement	56-57
References	58

CHAPTER IV : Interaction and Micellization Behavior of CTAB in NaPSS in the presence and absence of MR in aqueous and ethanol/water solvent media at 298.15, 308.15 , and 318.15 K by conductivity method

	59-97
4.1. Introduction	59-61
4.2. Experimental	61
4.2.1. Materials and Methods	61
4.3. Results and discussion	61
4.3.1. Studies on Conductivity	61-73
4.3.2. Thermodynamics of Micellization	73-76
4.3.3. Influence of temperature and ethanol	77-84
4.3.4. Changes in slopes and the value of the degree of counterion ionization (α)	84-86
4.3.5. Changes in ΔG_m^0 with solvent parameters	86-91
4.4. Conclusion	91-92
References	93-97

CHAPTER V : 98-125

5.1. Introduction	98-99
5.2. Experimental	99
5.2.1. Materials and Methods	99
5.3. Results and Discussion	100
5.3.1. DTAB in NaCMC	100-103
5.3.2. DTAB in NaCMC in the presence of MO	104-106
5.3.3. Explanation of Micellization from the thermodynamic point of view	107-108
5.3.4. Impact of temperature and ethanol	109-120
5.3.5. Changes in slopes and degree of counterion dissociation (α)	121-121
5.4. Conclusion	122-122
References	124-125

CHAPTER VI : UV-visible Spectroscopic Investigation on the spectral and interaction tendencies of Methyl Red with CTAB in NaPSS in

aqueous and ethanol/water mixed solvent media at room temperature (298.15 K).	127-153
6.1. Introduction	127-128
6.2. Experimental	130
6.2.1. Materials	130
6.2.2. Methods	130-130
6.3. Results and Discussion	131
6.3.1. Spectral behavior of MR in different solvent mixtures	131-137
6.3.2. Analysis and calculation of the critical micelle concentration (CMC*)	139-140
6.3.3. Impact of ethanol (EtOH) on CMC*	142-142
6.3.4. Binding constant computation using spectroscopic information	144-145
6.3.5. The binding characteristics of MR from spectroscopic viewpoints.	148-147
6.4. Conclusion	149-148
References	151-153

CHAPTER VII : Spectroscopic Investigation on Interaction of Methyl Orange with Surfactant (DTAB) under the impact of Polyelectrolyte (NaCMC) in varying ethanol/water mixture solvent mixtures at room temperature (298.15 K)

	156-178
7.1. Introduction	156-155
7.2. Experimental	157
7.2.1. Materials	157-156
7.2.2. Methods	158
7.3. Results and discussion	159
7.3.1. Spectral variation of MO in various solvent mixtures	159-163
7.3.2. Analysis and calculation of the critical micelle concentration (CMC*)	166-166
7.3.3. Impact of ethanol (EtOH) on CMC*	170-168
7.3.4. Binding constant computation using spectroscopic information	172-172
7.3.5. The binding characteristics of MO from spectroscopic viewpoints.	175-174
7.4. Conclusion	177-175
References	179-178

CHAPTER VIII: Tensiometric investigation on Surface, Micellization, and Thermodynamic behavior of Surfactant (CTAB) in Polyelectrolyte (NaPSS) with and without Dye (MR) in water-ethanol mixed solvent media at varying temperatures.

182-234

8.1. Introduction	182-184
8.2. Experimental	188
8.2.1. Materials and Methods	188
8.3. Results and discussion	189
8.3.1. Surface Tension (γ) Studies	189-195
8.3.2. Comparative explanation of the impact of temperature and ethanol on the Change of CMC^* , and γ_{CMC}	198-202
8.3.3. Thermodynamics of adsorption and micellization	205-221
8.3.4. Change of γ_0/γ_{CMC} with temperature and volume fraction of ethanol	226-224
8.3.5. Change of ΔG_{eff}^0 with temperature and V.F. of ethanol	228-226
8.3.6. Change of ΔG_{min} with temperature and volume fraction of ethanol	230-228
8.3.7. Correlation of $\Delta G_{ads}^0/\Delta G_m^0$ with volume fraction of ethanol	233-230
8.4. Conclusion	234-231
References	235-234
CHAPTER IX : Concluding Remarks	239-239
APPENDIX I	244
APPENDIX II	245
BIBLIOGRAPHY	246-249
INDEX	250-255