Registration no: | | | | | | | | | | |

Total Number of Pages: 02 **M.Sc.**

MCYC203

2nd Semester Regular Examination 2016-17
PHYSICAL CHEMISTRY-II
BRANCH(S): M.Sc.(AC)
Time: 3 Hour
Max marks: 70
Q Code:Z946

Question No.1 which is compulsory and any five from the rest
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions**: **(2 x 10)**

a) What are complex reactions? Name the different disturbing factors in complex reactions

b) What are fast reactions? Give their general features.

c) Explain what is micellization?

d) What is meant by quantum yield?

e) What are the assumptions of collision theory?

f) Mention the difference between fluorescence and phosphorescence.

g) Explain the terms internal conversion and intersystem crossing?

h) Write the Einstein relation with reference to transport phenomena and define each term involved therein?

i) What are bimolecular photophysical processes?

j) What is meant by surface active agents? Give two examples.

Q2 **a)** Deduce the rate expression for the reaction between two ions in solution based on double sphere model. **(6)**

b) Lindemann mechanism for a unimolecular reaction is given below: **(4)**

$$A + A \underset{k_{-1}}{\overset{k_1}{\leftrightarrow}} A^* + A$$

$A^* \xrightarrow{k_2} P$. Show that: $\frac{d[P]}{dt} = \frac{k_2 k_1 [A]^2}{k_{-1}[A] + k_2}$

Q3 **a)** What is chain reaction? Explain various steps of a chain reaction specifying an example. **(3)**

b) For a primary salt effect show that: $\log k = \log k_0 + 1.018 Z_A Z_B \sqrt{I}$ where the terms have their usual meaning. **(4)**

c) Discuss the principle of the stopped flow method giving the block diagram of the stopped flow apparatus. **(3)**

Q4		Derive Fick's laws of diffusion. Establish the relation between diffusion co-efficient and mean free path.	**(7+3)**
Q5	**a)**	Explain the formation of surface films on liquids.	**(3)**
	b)	What is microemulsion? Explain with examples.	**(2)**
	c)	Give the structure of a micelle. Explain what is meant by reverse micelles.	**(1+2)**
	d)	What is meant by counter ion binding to micelles?	**(2)**
Q6		Write brief notes on any TWO:	**(2X5)**
	a)	Diffusion limited reactions.	
	b)	Laws of photochemical equivalence.	
	c)	Thermodynamics of micellization.	
	d)	Kasha's rule	
Q7		Discuss the Kramer's theory of reaction kinetics. How does the Kramer's overall rate of a chemical reaction satisfy two solutions in limiting regimes?	**(8+2)**
Q8		Write notes on any TWO.	**(2x5)**
	a)	Rice-Herzfeld scheme.	
	b)	Isotope effect.	
	c)	Franck-Condon principle.	
	d)	Catalytic activity at surfaces.	