

**C. ABDUL HAKEEM COLLEGE (AUTONOMOUS),  
MELVISHARAM - 632 509.  
SEMESTER EXAMINATIONS, NOVEMBER - 2018**

**M.Sc., CHEMISTRY**

**SEMESTER I**

**P15MCH103 – PHYSICAL CHEMISTRY - I**

Time: Three Hours

Maximum: 75 Marks

**SECTION - A (5 X 6 = 30 Marks)**

Answer **ALL** Questions.

1. a) How does chemical potential vary with temperature?  
(Or)
- b) Derive Duhem-Margules equation.
2. a) Write notes on Linear Free Energy relationship.  
(Or)
- b) Explain Hammett equation.
3. a) Discuss Bronsted catalysis law.  
(Or)
- b) Explain the inhibition of enzyme catalysed reactions.
4. a) Write notes on Vibrational spectroscopy of CO<sub>2</sub>.  
(Or)
- b) Explain the rotational spectra of H<sub>2</sub>O molecule.
5. a) Compare reducible and irreducible representations.  
(Or)
- b) Explain – Direct product representation.

**SECTION - B (3 X 15 = 45 Marks)**

Answer **ANY THREE** Questions.

6. a) Explain activity and activity coefficient.  
b) Describe a method of determining the activity coefficient of a non-electrolyte.
7. a) What is Kinetic isotopic effect? Explain its classification.  
b) Discuss the linear free energy relationships and their utility.
8. a) Explain the mechanism of acid-base catalysis.  
b) Derive rate expression for enzyme catalysed reaction and discuss the influence of p<sup>H</sup> on the rate.
9. a) Explain Einstein's transition probabilities.  
b) Explain the rotational spectrum of a non-rigid rotator and compare it with rotational spectrum of a rigid rotator.
10. a) What is meant by symmetry operation? Explain any three symmetry operations with suitable examples.  
b) Explain the group multiplication table of C<sub>2v</sub> point group.

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