DMM-1568
M. Sc. (Sem. IV) (Chemistry) Examination
April / May - 2016
Physical Chemistry : Paper - I (Core Course)

Time : 3 Hours]  
[Total Marks : 70

Instructions :
(1) Fill up strictly the details of \( \text{\#} \) signs on your answer book.
(2) Attempt all four questions.
(3) Figures to the right indicate full marks.

1. Answer any 3 from the following : 18
   (a) Describe the effect of ionic strength and solvent on reaction rates.
   (b) Explain conventional transition state theory. Describe its assumption and limitations.
   (c) Derive an expression for CTST theory.
   (d) Explain Hammett relationships. Explain substituent and correlation effects.

2. Answer any 3 from the following : 18
   (a) State the merits of shell model and liquid drop model.
   (b) Describe the radiolysis of water and free radical formation in water radiolysis.
   (c) Write a note on square well potential model.
   (d) What is a thermal reactor? Describe the principle of thermal reactor.
3 Answer any 3 from the following:

(a) Explain emulsions and their types and applications.
(b) Write a note on: acidity function.
(c) Define the terms homogeneous and heterogeneous catalysis. Explain heterogeneous catalysis with suitable examples.
(d) Write a note on micelles and reverse micelles.

4 Answer any 4 from the following:

(a) Write a note on magic numbers.
(b) Explain various units involved in radiation dosimetry.
(c) Write a note on liquid crystals.
(d) Explain steady state and equilibrium treatment for catalyzed reaction.
(e) Calculate the ionic strength of 0.1 M BaCl₂ and 0.1 M ZnSO₄.
(f) Explain the rate theories based on thermodynamics.