Exam.Code:0001
Sub. Code: 0051

2012

B.A./B.Sc. (General) First Semester

Chemistry

Paper -III: Physical Chemistry – A

(Same for Microbial and Food Technology)

Time allowed: 3 Hours | Max. Marks: 22

***NOTE**: Attempt five questions in all, including Question No. 9 (Section-E) which is compulsory and selecting one question each from Section A-D. Use of log tables and simple calculator is allowed.*

x-x-x

Section – A

1. (a) Differentiate the following w.r.t. x 2

$$y = \left(x + \frac{1}{x}\right)\left(x^2 - \frac{1}{x^2}\right)$$

(b) Solve the following simultaneous equations graphically 2

$2x + 3y = 18$ and $2(x - 1)y = 3$

2. (a) A sample of iron ore on analysis gave following percentage values for the iron content. 7.08, 7.21, 7.12, 7.09, 7.16, 7.14, 7.07, 7.14, 7.18, 7.11 2

Calculate the mean and standard deviation for these values.

(b) What are different types of errors? Why indeterminate errors are called so? 2

Section – B

3. (a) Show diagrammatically, the effect of temperature on maxwell's distribution of speeds. 2

(b) Why do real gases fails to obey the ideal gas equation at higher pressure and low temperatures? 2

4. (a) What is compressibility factor? What is the effect of temperature and pressure on compressibility curves of real gases? 2

(b) Calculate the value of Van der Waals constants in terms of T_c and P_c 2

Section – C

5. (a) Derive an expression for the rate constant for reactions of first order when the initial concentration of reactants is not known. 2

(b) What are Pseudounimolecular reactions? Explain taking example of the hydrolysis of ethyl acetate in acidic medium. 2

6. (a) What is 'Half life period' of a reaction? Derive a general expression for half life period of a reaction of nth order. 2

(b) List main points of difference between molecularity and order of a reaction. 2

Section – D

7. (a) Briefly describe 'Transition state theory' or 'Theory of absolute reaction rates'. What are the advantages of this theory over collision theory? 2

(b) Explain the effect of temperature on the rate of reaction with the help of Arrhenius equations. How can you calculate activation energy? 2

8. (a) Discuss the mechanism of heterogeneous catalyst with suitable example. 2

(b) Describe the mechanism of enzyme-catalysed reaction as proposed by Michaelis-Menten. 2

P.T.O.

Section – E

9. (a) Define mean, median and mode. 1
   (b) What is instantaneous rate of a reaction? 1
   (c) What are Catalytic promoters and inhibitors? 1
   (d) Integrate, $\int \frac{x^2-4}{x+1}\,dx$. 1
   (e) What is Joule Thomson Effect? 1
   (f) Give units of Van der Waal's constants 'a' and 'b'. 1

x-x-x