(i) Printed Pages: 3 Roll No. .....

(ii) Questions : 9 Sub. Code : 0 0 5 1

Exam. Code : 0 0 0 1

B.A./B.Sc. (General) 1st Semester

1128

CHEMISTRY (Same for B.Sc. Microbial & Food Tech.)

Paper-III : Physical Chemistry-A

Time Allowed : Three Hours] **[Maximum Marks : 22**

Note :— Attempt **five** questions in all, selecting **one** question each from Sections A, B, C and D. Section E is compulsory. Use of simple calculator is allowed.

SECTION—A

I. (a) Without using tables prove that :

$$3\log 1.5_{10} + \log 240_{10} - 2\log 9_{10} = 1. \quad 2$$

(b) Integrate :

$$\int \sin 3x \cos 4x \, dx. \quad 1$$

(c) Give the necessary and sufficient condition for maximum and minimum value of a function. 1

II. (a) What are the differences between precision and accuracy of an analysis ? 1

(b) What do you understand by median and arithmetic mean ? 1

(c) Discuss curve fitting and principle of least squares. 2

SECTION—B

III. (a) What do you know about most probable velocity, average velocity and root mean square velocity ? How are they interrelated ? 1

(b) Give the units and significance of Van der Waal's constants 'a' and 'b'. 1

(c) Derive kinetic gas equation and explain various gas laws with the help of it. 2

IV. (a) Explain compressibility factor and its significance. 1

(b) Explain the term degrees of freedom with proper examples. 1

(c) What are critical constants ? How are they measured experimentally ? 2

SECTION—C

V. (a) Derive expression for half life period of a Ist order reaction. What is its significance ? 1

(b) Differentiate molecularity and order of a reaction. 1

(c) Give the factors on which rate of a chemical reaction depends. 2

VI. (a) Explain Collision theory of reaction rates. 1

(b) The half life period of decomposition of a compound is 20 minutes. If the initial concentration is reduced to half the $t_{½}$ is reduced to 10 minutes. Calculate the order of the reaction. 2

(c) Discuss any two methods to determine the order of a chemical reaction. 1

SECTION—D

VII. (a) Derive Michaelis Menton equation for enzyme catalysis. How the equation helps in understanding the mechanism of the reaction ? 2

(b) What are :

(i) Catalytic Promoters

(ii) Catalytic Inhibitors ? 2

VIII. (a) Give examples. Discuss transition state theory of reaction rates. 2

(b) Explain the kinetics of Acid Base Catalysis. 2

SECTION—E (Compulsory)

IX. (a) What is the effect of catalyst on Activation energy ?

(b) What is temperature coefficient ?

(c) Find the derivative of $\cos (x^2 + 2)$.

(d) Give the units of rate constant for I^{st} order and zero order reaction.

(e) What is average life of a reaction ?

(f) What is instantaneous rate of a reaction ? $6 \times 1 = 6$