

**T.Y.B.SC. SEM – VI (2014 COURSE) : SUMMER - 2018**  
**SUBJECT : CHEMISTRY : PHYSICAL CHEMISTRY- VI**

Day : **Tuesday**  
Date : **10/04/2018**

**S-2018-0765**

Time : **12.00 NOON TO 02.00 PM**  
Max. Marks : 40

**N.B.**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SAME** answer book.
- 4) Use of non-programmable calculator is allowed.

**SECTION – I**

**Q.1** Attempt any **TWO** of the following: **(10)**

- a) Define the terms : **i)** wavelength **ii)** frequency  
**iii)** velocity and **iv)** wave number.
- b) What are the applications of rotational spectra?
- c) Explain types of radioactive decay.

**Q.2** Attempt any **TWO** of the following: **(10)**

- a) Discuss the elements of symmetry.
- b) What are Weiss and Miller indices?
- c) Describe radioactive decay kinetics.

**SECTION – II**

**Q.3** Attempt any **TWO** of the following: **(10)**

- a) What do you mean by stokes and anti stokes lines in Raman Spectra?
- b) Explain the term 'Refractive index'.
- c) Draw molecular energy level diagram.

**Q.4** Solve any **TWO** of the following: **(10)**

- a) The half-life of radium is 1580 years. Calculate its disintegration constant.
- b) A crystal plane intercepts the three crystallographic axes at the multiples of unit distances  $3/2$ , 2, and 1. What will be the Miller indices of the plane?
- c) The force constant of the bond in 'CO' molecule is  $1.902 \times 10^6$  dynes/cm and reduced mass in  $1.138 \times 10^{-23}$  g. Compute the frequency of vibration of the 'CO' molecule. (C = 12, O = 16).

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