

T.Y.B.SC. SEM – VI (2014 COURSE) : WINTER- 2017
SUBJECT : CHEMISTRY : PHYSICAL CHEMISTRY- VI

Day : Monday
Date : 23/10/2017

W-2017-0673

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.
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SECTION – I

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

- a) What is zero point energy?
- b) State the selection rule for rotational transitions and obtain the equation $\bar{\nu}_{rot} = 2B(J+1)$.
- c) Obtain the equation for radioactive decay constant.

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

- a) Derive Bragg's equation in its standard form.
- b) Elaborate an N/Z ratio.
- c) Draw neat diagrams of [100], [110] and [111] planes.

SECTION – II

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

- a) Discuss dilute solution method for measurement of dipole moment.
- b) Describe distortion polarization in case of non-polar molecule.
- c) Give schematic representation of a Raman Spectrum

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

- a) Calculate the reduced mass and moment of inertia of $\text{Br}^{79} - \text{Cl}^{35}$ molecule. The bond length of Br-Cl is 0.214 nm. $[N = 6.024 \times 10^{23}]$.
- b) A crystal plane intercepts the three crystallography axes at the multiples of unit distances 5/2, 3, 1. What will be Miller indices of the plane.
- c) The activity of radioelement falls to half of its initial value in 8 days. Calculate:
i) decay constant ii) the time for the activity to fall to $1/10^{\text{th}}$ of its initial value.

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