VPG (4) — Chem
(13) Gr. C

2016-18

Time : 3 hours

Full Marks : 70

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

*Answer any **five** questions.*

1. (a) Define hydrogen molecule ion.

   (b) Establish the evaluation of ψ and ψ^2.

   5+9 = 14

2. State and explain the following : 7×2 = 14

   (a) Born Oppenheimer Equation

   (b) Roothann's Equation

3. Explain the Application of HMO theory to Benzene. 14

4. (a) Discuss Heteronuclear Conjugated System of Pyrrole.

   (b) Derive Electronic energy of molecule.

   9+5 = 14

5. What is scattering length ? Explain Law energy scattering theory. 4+10 = 14

6. Explain the combination of one 2S and three 2P orbital. http://www.vbuonline.com 14

7. Define Levinson's Theorem. Write the application of scattering theory in square well Potential. 14

8. Write short notes on any **two** of the following : 7×2 = 14

   (a) Breit-wigner Formula

   (b) Levinson's Theorem

   (c) Coulomb wave function

9. Explain the Density function theory and discuss its application. 7+ 7 = 14