

3. In hydrogen molecule, the energy of dissociation of the molecule into atoms is theoretically calculated to be.

- (a) 1.76 eV (b) 2.78 eV
 (c) 3.14 eV (d) 4.14 eV.

4. Let A_{21} and B_{21} be Einstein's coefficients, then

(a) $\frac{A_{21}}{B_{21}} = \frac{8\pi h\nu^3}{C^2}$

(b) $\frac{A_{21}}{B_{21}} = \frac{8\pi h\nu^2}{C^3}$

(c) $\frac{A_{21}}{B_{21}} = \frac{C^3}{8\pi h\nu^3}$

(d) $\frac{A_{21}}{B_{21}} = \frac{8\pi h\nu^3}{C^3}$

5. The lowering operator is

- (a) $(\hat{p} + imw \hat{x})$ (b) $(\hat{p} - imw \hat{x})$
 (c) $(imw \hat{x} - \hat{p})$ (d) $(\hat{p} \pm imw \hat{x})$.

Answer ALL questions in 1 or 2 sentences :

6. Define Green's function.
 7. What is meant by self-consistent field?
 8. What is meant by hybridization?
 9. Define Einstein's coefficients.
 10. What is a field?

SECTION B — (5 × 4 = 20 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain the terms differential scattering cross-section and total scattering cross-section.

Or

(b) Explain briefly the condition for validity of Born's approximation.

12. (a) What is meant by Central field approximation?

Or

(b) Give an account of the terms arising due to L-S coupling in complex atoms.

13. (a) Explain briefly the term spin orbit interaction.

Or

(b) Write a note on covalent bonding.