2. Perturbed Hamiltonian H' in central field approximation is

(a) $H' = \sum_{i>j} \frac{e^2}{r_{ij}} - \sum_i \left[\frac{Ze^2}{r_i} + u(r_i) \right]$

(b) $H' = \sum_{i>j} \frac{e^2}{r_{ij}} - \frac{Ze^2}{r_i}$

(c) $H' = \sum_{i>j} \frac{e^2}{r_{ij}} + \sum_i \left[\frac{Ze^2}{r_i} - u(r_i) \right]$

(d) $H' = \sum_{i>j} \frac{e^2}{r_{ij}} + u(r_i)$.

3. Potential energy minimum of H_2^+ ion is,

(a) 0.77 ev (b) 5 ev

(c) 1.77 ev (d) 3.54 ev.

4. Bohr's angular frequency is

(a) $\frac{E_k - E_n}{\hbar}$

(b) $\frac{E_k + E_n}{\hbar}$

(c) $\frac{E_k - E_n}{w}$

(d) $\frac{E_k - E_n}{\hbar w}$.

5. Creation operator $\hat{a}$ is

(a) $(\hat{p} - imw\hat{x})$

(b) $\frac{1}{\sqrt{2m\hbar w}}$

(c) $\frac{1}{\sqrt{2m\hbar w}}(\hat{p} + \hat{x})$

(d) $\frac{1}{\sqrt{2m\hbar w}}(\hat{p} - imw\hat{x})$.

Fill up the blanks :

6. The relation connecting scattering amplitude $f(\theta, \phi)$ with differential scattering cross section is $|f(\theta, \phi)|^2$ is ————.

7. Hartree assumed that the electrons in an atom, move independently in a ————.

8. Heiler–London model is based on ———— theory.

9. Relativity correction for the momentum, '$\vec{P}$' is ————.

10. Hamiltonian and Lagrangian are connected by ————.