Ex.1 Ex. 3.2
Ex.2 Ex. 3.3
Ex.3 Ex. 3.4
Ex.4 Ex. 3.9
Ex.5 Ex. 3.11
Ex.6 Ex. 3.12
Ex.7 Ex. 3.18
Ex.8 15 Suppose that a particle is described by the wavefunction $\Psi(x)$ with real values. Find the probability that the particle is found to be in the even state (by even, it means the parity is $+1$), and the probability that the particle is in the odd state.

Ex.9 A particle of mass $m$ in a symmetric infinite well $(-a < x < a)$ is described by the following wavefunction at $t = 0$

$$
\Psi(x, 0) = \frac{N}{\sqrt{a}} \left[ (3 + 2i) \cos\left(\frac{\pi x}{2a}\right) - 2 \sin\left(\frac{\pi x}{a}\right) + 3i \cos\left(\frac{3\pi x}{2a}\right) \right]
$$

where $N$ is a normalization constant. (a) 5 What is $\Psi(x, t)$? (b) 10 Evaluate the average energy $\langle E \rangle$, and $\Delta E$ at time $t$. (c) 5 What is the probability for finding this particle with $E = \frac{\hbar^2 \pi^2}{2ma^2}$? (d) 10 Find $\langle x \rangle$ at time $t$.

Ex.10 Define the complex conjugation operator by $\hat{C}\psi(x) = \psi^*(x)$. (a) 5 Is this operator Hermitian? (Prove your answer). (b) 10 Show that any complex number $a + ib$ is an eigenfunction of $\hat{C}$, and find the corresponding eigenvalue.