Jashore University of Science and Technology

Department of Physics

Bachelor of Science with Honours in Physics

1st semester of 3rd year, Academic session: 2024–2025

Course no.: PHY 3103 **Course title: Quantum Mechanics I**

Class test no.: 01 **Date: 15 December 2025**

Roll:	

1. Which of the following wave functions cannot be solution of Schrödinger equation for all values of x? [6]

(a) $\psi = A\cos x$

(b) $\psi = A\tan x$

(c) $\psi = A(\cos x)\cdot(\tan x)$

(d) $\psi = A\,x\sin(x)$

(e) $\psi = Ae^{-x}$

(f) $\Psi = Ae^{-i(Et-xp_x)/\hbar}$

(g) $\psi = Axe^{-x^2}$

(h) $\psi = A\ln(1+5x)$

2. Write down the postulates of quantum mechanics. [4]

3. What is the uncertainty relation between position and momentum? Explain its significance. Show that the uncertainty relation hold dimensionally. [4]

4. A wave function has the value $\psi(x) = A\sin x$ in the region $0 < x < \pi$ and zero elsewhere. (a) Normalize the wave function. (b) Find the probability that the particle is between $x = 0$ and $x = \pi/2$. [6]