Jashore University of Science and Technology

Bachelor of Science Electrical and Electronic Engineering

1st semester of 1st year, 2025

Course no.: 053311 PHY 1101 **Course title: Physics**

Class test no.: 02 **Date: 19 October 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. 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 $x = \pi/2$. [10]

3. What is the binding energy of a nucleus? Calculate the binding energy of He. Given that the measured mass of He is 4 a.m.u. [7]

4. Complete the nuclear reaction ${}^{13}_{6}\mathrm{C}({}^{4}_{2}\mathrm{He},..){}^{16}_{8}\mathrm{O}$. If the masses of ${}^{16}_{8}\mathrm{O}$, ${}^{13}_{6}\mathrm{C}$ and ${}^{4}_{2}\mathrm{He}$ are 15.9949 u, 13.0034 u and 4.0026 u respectively, find the Q-value of the reaction. [7]