# Jashore University of Science and Technology
## Department of Physics
### Bachelor of Science with Honours in Physics
### Second semester of Third year

**Course no.: PHY 3209** **Course title: Statistical Mechanics**

**Last date of submission: October 10, 2022**

**1.** What are the ensembles that are considered in statistical mechanics? Write down their characteristics. [5]

**2.** What is meant by "entropy of mixing"? Explain in details how Gibbs paradox is resolved. [10]

**3.** Calculate the average energy of a three-dimensional harmonic oscillator. [5]

**4.** From Bose–Einstein distribution derive Planck Radiation Law. What are the observations that may be made concerning Planck Radiation Law. [10]

**5.** Evaluate the partition function at temperature $T$ for a classical one-dimensional oscillator having an energy $\epsilon = \frac{p_x^2}{2m} + \frac{1}{2}\mu x^2$. Hence find the mean energy of such an oscillator at this temperature. [10]