



**Department of Nutrition and Food Engineering**  
**Faculty of Health and Life Sciences**  
**B.Sc. in Nutrition and Food Engineering**  
**Midterm Examination Spring 2025**

**Course Code:** 0531-1103

**Course Title:** Physical, Inorganic and Analytical Chemistry

**Level and Term:** L-1, T-1

**Section:** 251 All

**Course Teacher Initials:** DNU, DMR, DFR

**Time:** 1 hour 30 minutes

**Total Marks:** 25

**Splitting any answer is strictly prohibited**

- |  | Marks |
|--|-------|
| 1. (a) Explain which of the following orbital is possible or not: [CLO1; PLO1; C2]<br>2d, 3p, 3f and 4p.   | 2     |
| (b) In periodic tables if you move left to right in Period-2 what [CLO1; PLO1; C1]<br>change in i) <b>atomic radius</b> and ii) <b>electronegativity</b> will<br>you expect? | 3     |
| 2. (a) Explain hydrogen bond with example. [CLO1; PLO1; C3]  | 2     |
| (b) What are differences between ionic and covalent bond? [CLO1; PLO1; C2]   | 3     |
| 3. (a) How many lone pair electrons present in O atom of H <sub>2</sub> O [CLO1; PLO1; C1]<br>and C atom of CH <sub>4</sub> ?  | 2     |
| (b) Write the name and symbol of Group 1 elements in the [CLO1; PLO1; C3]<br>periodic table. Why are they called alkali metal?   | 3     |
| 4. (a) How much Na <sub>2</sub> CO <sub>3</sub> is needed to prepare 300mL of 0.25M [CLO2; PLO1; C3]<br>Na <sub>2</sub> CO <sub>3</sub> standard solution?                   | 2     |
| (b) A compound was analyzed and found to contain 50.00% [CLO2; PLO1; C3]<br>Na, 10.00% C and 40.00% O. Determine its empirical<br>formula.                                   | 3     |
| 5. (a) Calculate the number of molecules of H <sub>2</sub> O present in 1g [CLO2; PLO1; C3]<br>H <sub>2</sub> O.   | 2     |
| (b) Find out the percent composition of Aluminum, Sulfur and [CLO2; PLO1; C3]<br>Oxygen in Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> .                                 | 3     |