



বাংলাদেশ আর্মি ইন্টারন্যাশনাল ইউনিভার্সিটি অব সায়েন্স এন্ড টেকনোলজি (বিএআইউএসটি) কুমিল্লা  
 BANGLADESH ARMY INTERNATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY (BAIUST) CUMILLA

Mid Term Examination, Spring 2023  
 Department of Electrical and Electronic Engineering  
 Level-1, Term-II

Course Code: CHEM-121  
 Course Title: Chemistry

Time: 1 hr  
 Full Marks: 60

Notes:

- Answer any 02 (two) of the following 03 (three) questions.
- Each question carries 30 marks.
- Figure on the right of each question indicate marks for respective question.

- Explain metallic bond in a molecule. 05
  - Write down the electronic configuration of the oxygen (O) and carbon (C) atom according to Hund's rule. 10
  - Prove that,  $\lambda = h/mv$  and determine the de Broglie wavelength for an electron moving at a speed of  $7.5 \times 10^6$  m/s. ( $m_e = 9.1 \times 10^{-31}$  kg). 15
- Define gel with an example. 05
  - Compare between solid solution and liquid solution. 10
  - Determine the mass of NaOH required for making 250 mL of a 0.3 M solution. 15
- Define amphoteric substance with an example. 05
  - $H_2O$  molecule acts as an acid, explain with reaction. 10
  - Explain and identify conjugate acid and base from the reactions given below: 15
    - $HCl(aq) + H_2O(l) \rightarrow Cl^-(aq) + H_3O^+(aq)$
    - $NH_3(g) + H_2O(l) \rightarrow NH_4^+(g) + OH^-(aq)$