Eastern University

Faculty of Engineering and Technology

Department of Computer Science & Engineering

Mid-term Examination, Fall-2020

Course Code: CHM 201, Course Title: Chemistry

Attention: Please go through the following guidelines for Answer Script Submission

1. Use only a **black** ballpoint pen for sketch and writing. Don't send typed copy in MS Word. Only a Scanned copy of your own handwriting will be accepted. You may send it as PDF/MS Word (after scanning)/ Images.
2. Write your Name, ID No. Course Code, Course Title, Section, **Mid-Term Exam, Fall 2020** on the Title page of your answer script.
3. Put page numbers (1/n, 2/n. … … n/n) at the bottom of each page. Try to minimize your number of pages.
4. Return the scanned copy of your answer script to **iqbalcjnu@gmail.com** within **19th December 2020.** For any queries, feel free to contact me. **Mobile No.: 01712054276**
5. Write your student ID, course code, and section in the email subject.
6. It is mandatory to preserve hard copies of the answer script for future reference.

NB: Answer any three questions **Total Marks: 30**

Right margin indicates the marks

1. (a) Describe the contributions of the following scientists to our knowledge of atomic structure: J. J. Thomson, Ernest Rutherford and Avogadro. **[05]**

(b) Ocean is the largest water body of the world. Sea water contain 96.5% water and 2.5% salts. The average temperature of the ocean surface waters is about 17°C. **[05]**

(i) Calculate the number of moles of H_2O in 100.2 mg of H_2O.

(ii) Calculate the percent composition by mass of each of the elements in H_2O.

(iii) How many H_2O molecules are present in 50 mg of H_2O?

(iv) Calculate the weight of a single H_2O molecule.

(v) Convert freezing point of water from degree Celsius to Fahrenheit and Kelvin.

2. (a) Explain your understanding on (i) weight and mass (ii) Spin quantum number **[03]**

(b) Tabulate the values of l, m_l, orbitals with designation and total electrons in n = 6. **[04]**

(c) Calculate the wavelength (in nanometers) of an electron moving at 7.0×10^2 cm/s. **[03]**

3. (a) Explain the disadvantages of using decimal notation over scientific notation. **[03]**

(b) Carry out the following arithmetic operations and round off the answers to the appropriate number of significant figures: (a) 7.310 km ÷ 5.70 km (b) 1.0026 mg - 0.08080 mg (c) 1.02×10^6 Pa + 7.743×10^7 Pa (d) 1.987456 cm × 0.012346789 cm. **[04]**

(c) Calculate the amount of oxalic acid used to prepare 800 mL of 50mM (Millimolar) solution **[03]**

4. (a) State important differences between a metal and a nonmetal with examples. **[03]**

(b) Give two examples of each of the following: (i) a diatomic molecule containing atoms of the same element, (ii) a diatomic molecule containing atoms of different elements, (iii) a polyatomic molecule containing atoms of the same element, (iv) a polyatomic molecule containing atoms of different elements. **[04]**

(c) Fill in the blanks in the following table and show your calculation process: **[03]**

Symbol		$^{88}_{38}Sr^{2+}$		
Protons	15			96
Electrons	15		90	
Neutrons	16		146	151
Net-charge			+2	0