

Mid-Term Examination, Spring-2024
Course Title: Engineering Chemistry
Course Code: CHEM 0531175

Marks: 20

Time: 1 Hour

Answer all the questions. Assume necessary data/values if missing

1. (a) Explain Aufbau principle. Consider an elemental zoo where each element is a unique animal with different electron configuration. What would be your idea to group them in different cage. 2+2
- (b) Discuss briefly the postulates of Bohr's atomic model. 3
- (c) For $n=3$, list all the possible quantum numbers of electron associated with that orbit. 3

2. (a) Draw the orbital diagram of d_{xy} , d_{yz} , d_{zx} , $d_{x^2-y^2}$ and d_{z^2} . Explain their reason for orbital splitting. Why d-block elements form colorful compounds. Discuss with example. 2+1+1
- (b) Explain the periodic trend of ionization potential and atomic radius of atoms. 3
- (c) Fill the table with appropriate values. 3

Nuclide	p^+	n^0	e^-	Mass #
Oxygen -		10		
-	33	42		
- 31	15			

or, Find out the isotopes, isotones and isobars from the list:

$^{12}_6\text{C}$, $^{14}_7\text{N}$, $^{14}_6\text{C}$, $^{40}_{19}\text{K}$, $^{16}_8\text{O}$, $^{40}_{20}\text{Ca}$, $^{40}_{18}\text{Ar}$, $^{13}_6\text{C}$, $^{15}_7\text{N}$