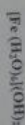


S.N. (i) Answer any three questions from each PART (ii) Use separate answer script for each PART  
 (iii) Marks allotted are indicated in the margin (iv) Special Instruction (if any) N/A

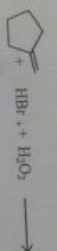
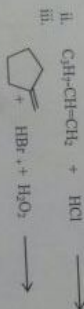
**PART A**

(Answer any three questions)

1. a) Define an atom. 3  
 b) Differentiate between orbit and orbital. 7  
 c) Explain Bohr atomic model with its limitations. 15  
 d) Find the wavelength in Å of the line in Paschen series that is associated with drop of the electron from the fifth orbit. The value of Rydberg constant is  $109676 \text{ cm}^{-1}$ . 10
2. a) State Hund's rule with an example. 10  
 b) Write down the main characteristics of modern periodic table with its limitations. 12  
 c) Find out the position of  $^{54}\text{Cr}$  in the periodic table. 5  
 d) Write a set of quantum numbers for an electron where the value of n is 4. 8
3. a) Write a short note on co-ordination covalent bond. 5  
 b) Explain Molecular Orbital Theory (MOT). 10  
 c) Draw the MO diagram for NO molecule. What is the bond order of NO molecule? Mention its magnetic properties. 15  
 d) Write down all types of chemical bonds' name and numbers of different bonds which exist in the following molecule? 5



4. a) Define nucleophile with an example. 6  
 b) What is  $\text{S}_{\text{N}}1$  reaction? Considering a suitable example explain  $\text{S}_{\text{N}}1$  reaction's mechanism, rate equation and graphical presentation. 20  
 c) Fulfill the following reactions 3+3+9



**PART B**

(Answer any three questions)

5. a) What are noble gases? Show the Lewis dot structure of  $\text{H}_2\text{SO}_4$ . 5+5=10  
 b) Prove that the relative lowering of the vapour pressure of a dilute solution is equal to the mole fraction of the solute present in dilute solution. 15  
 c) Explain exothermic and endothermic reactions with examples. 10

**Bangladesh Army University of Science and Technology**

*Department of Computer Science and Engineering*

Final Examination, Fall 2016

Course No: EEE 1269

Time: 03 (Three) hours

Course Title: Electronic Devices and Circuits  
Fall Marks: 210

N.B.: (i) Answer any three question from each PART/SECTION (ii) Use separate answer scripts for each PART/SECTION

(iii) Marks allotted are indicated in the margin

(iv) Special Instruction (if any) -----

6. a) What do you mean by enthalpy of a reaction? Explain combustion enthalpy. 10  
 b) Define phase rule. 5  
 c) Draw the phase diagram of water system and explain it in detail. 20

7. a) What is activation energy? 5  
 b) Derive a first order rate equation for the reaction  $A \longrightarrow \text{Product}$ . 12  
 c) Prove that the half-life of a first order reaction is independent of the initial concentration. 8  
 d) For a certain first order reaction  $t_{1/2}$  is 100 sec. How long will it take for the reaction to be completed 75 %? 10

8. a) What is chemical equilibrium? 5  
 b) Establish the relationship between  $K_p$  and  $K_c$ . 15  
 c) Define self-ionization of water. 5  
 d) The value of  $K_p$  at 25°C for the following reaction is  $1.9 \times 10^3 \text{ atm}^{-1}$ . Calculate the value of  $K_c$  at the same temperature. 10



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$\Delta = \frac{2000000}{100} = 20000$

# Bangladesh Army University of Science and Technology

## Department of Computer Science and Engineering

Final Examination, Fall 2016

Course No: CHEM 1201

Time: 03 (Three) hours

Level-1 Term-II

Course Title: Chemistry

Full Marks: 210

N.B. (i) Answer any three questions from each PART

(ii) Use separate answer script for each PART

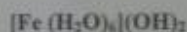
(iii) Marks allotted are indicated in the margin


(iv) Special Instruction (if any) N/A

### PART A

(Answer any three questions)

- |    |   |    |
|----|---|----|
| 1. | a) Define an atom.  | 3  |
|    | b) Differentiate between orbit and orbital.   | 7  |
|    | c) Explain Bohr atomic model with its limitations.  | 15 |
|    | d) Find the wavelength in Å of the line in Paschen series that is associated with drop of the electron from the fifth orbit. The value of Rydberg constant is $109,676 \text{ cm}^{-1}$ | 10 |
| 2. | a) State Hund's rule with an example.   | 10 |
|    | b) Write down the main characteristics of modern periodic table with its limitations.   | 12 |
|    | c) Find out the position of $_{24}\text{Cr}$ in the periodic table.   | 5  |
|    | d) Write a set of quantum numbers for an electron where the value of n is 4.  | 8  |
| 3. | a) Write a short note on co-ordination covalent bond.   | 5  |
|    | b) Explain Molecular Orbital Theory (MOT).  | 10 |
|    | c) Draw the MO diagram for NO molecule. What is the bond order of NO molecule? Mention its magnetic properties.   | 15 |
|    | d) Write down all types of chemical bonds' name and numbers of different bonds which exist in the following molecule?   | 5  |



- |    |   |       |
|----|---|-------|
| 4. | a) Define nucleophile with an example.  | 6     |
|    | b) What is $\text{S}_{\text{N}}1$ reaction? Considering a suitable example explain $\text{S}_{\text{N}}1$ reaction's mechanism, rate equation and graphical presentation. | 20    |
|    | c) Fulfill the following reactions  | 3×3=9 |
|    | i. $\text{CH}_3\text{-CH}_2\text{-CH=CH}_2 + \text{HBr} + \text{H}_2\text{O}_2 \longrightarrow$   |       |
|    | ii. $\text{C}_3\text{H}_7\text{-CH=CH}_2 + \text{HCl} \longrightarrow$  |       |
|    | iii.  + $\text{HBr} + \text{H}_2\text{O}_2 \longrightarrow$                            |       |

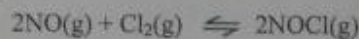
### PART B

(Answer any three questions)

- |    |   |        |
|----|---|--------|
| 5. | a) What are noble gases? Show the Lewis dot structure of $\text{H}_2\text{SO}_4$ .  | 5+5=10 |
|    | b) Prove that the relative lowering of the vapour pressure of a dilute solution is equal to the mole fraction of the solute present in dilute solution. | 15     |
|    | c) Explain exothermic and endothermic reactions with examples.  | 10     |

on from each PART/SECTION (ii) Use separate answer scripts for each PART/SECTION  
(iv) Special Instruction (if any)-----N/A-----  
the margin

- 6/ a) What do you mean by enthalpy of a reaction? Explain combustion enthalpy. 10  
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d) The value of  $K_p$  at  $25^\circ\text{C}$  for the following reaction is  $1.9 \times 10^3 \text{ atm}^{-1}$ . Calculate the value of  $K_c$  at the same temperature. 10



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