

Mid-West University  
**Examinations Management Office**

Birendranagar, Surkhet

**End Semester (Alternative/Physical) Examinations -2078**

Bachelor level/ B.Sc /6<sup>th</sup> Semester

Full Marks : 60

Time: 3hrs

Pass Marks : 30

**Subject : Advanced Chemistry III (CHEM461)**

*Candidates are required to give their answer in their own words as far as Practicable. The figures in the margin indicate full marks.*

**Inorganic Chemistry**

**Attempt all Questions**

**[2x10=20]**

1. a) What is plaster of paris? Write its uses.  
How can say that the RCC is a special blend of concrete? Write about the magnetic properties of lanthanide ions. [5]
- b) Describe the ion-exchange methods for separation of the lanthanide elements. [5]
2. a) Write the advantages of optical fibres. What is glazing? Write its significance in ceramics. Describe in brief about the structure of thiosulphate ion. [5]
- b) Explain the processes of manufacture of papers. What is Sicmen's Ozenizer. [5]

**Organic Chemistry**

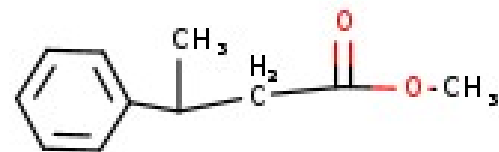
**Attempt all Questions**

**[2x10=20]**

3. a) What are the main purposes to introduce combinatorial chemistry?  
How can F.G. be modified during synthetic planning? Write the characteristics of a good synthetic plan. [5]
- b) Discuss green chemistry and explain the basic principles of green chemistry. [5]

**OR**

- a) Differentiate between linear and convergent synthesis. What are the synthesis of  $RCH_2CH_2OH$  and  $RCHO$ . Prepare the following TGT molecule using retrosynthetic analysis. [5]



- b) i) What is the role of Dimethyl Sulphur with oxalyl chloride in the chemical reaction. Show with mechanism.  
(ii) Write the main purpose of lead tetraacetate in chemical reaction. Show with its mechanism with alcohol.
4. a) Show your familiarity with functional Group interconversion and write the reason for c. What is Wolf Kishner Reduction. Show wit mechanism. [5]
  - b) Define protection and deprotection. What are the criteria for a good protecting group. How can you protect and deprotect alcoholic group in a chemical reaction. [5]

**Physical Chemistry**

**Attempt all Questions**

**[2x10=20]**

5. a) Which of the following molecules gives rotational spectra and why?  
a)  $HCl$  b)  $CS_2$ . What is Raman scattering? Define spectroscopy. How an electronic spectrum does arise? [5]
- b) Write the different steps involved in the photochemical change in the reaction between  $H_2$  and  $Br_2$ . Prove this reaction follows first order kinetics. [5]

**OR**

- a) Define force constant and zero point energy with respect to vibrational spectroscopy. Write down the selection rules for a harmonic oscillation. Calculate the moment of inertia of  $HCl$  molecule whose internuclear distance is 0.5 cm. [5]
  - b) State Frank and Condon principle. Discuss electronic transition in a diatomic molecule. [5]
6. a) Define chain reaction. What are the characteristics of chain reaction? The higher is the activation energy the slower is the rate of reaction, comments. Point out why transition state theory is superior to collision theory? [5]

- b) Write an expression for vibrational energy of a diatomic molecule taking as a simple harmonic oscillator. Write the selection rule for vibrational transition in simple harmonic motion. **[5]**

**THE END**