

KATHMANDU UNIVERSITY  
End Semester Examination  
January/February, 2025

Marks Scored:

Level : B.Pharm.

Year : II

Course : CHEM 203

Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

Date :

SECTION "A"

[20 Q. × 1 = 20 marks]

**Choose and mark [X] in the most appropriate option from each set of choices**

- A hexapeptide made from the repeating unit of Gly-Arg has  
 free amino group on Gly and free carboxyl group on Arg, 5 amide bonds.  
 free amino group on Gly and free carboxyl group on Arg, 6 amide bonds.  
 free amino group on Arg and free carboxyl group on Gly, 5 amide bonds.  
 free amino group on Arg and free carboxyl group on Gly, 6 amide bonds.
- Which of the following are the correct statements considering pyrrole (A) and pyridine (B).
  - A is less basic compared to B.
  - A undergoes electrophilic aromatic substitution more readily than B.
  - Electrophilic aromatic substitution in A and B takes place at 2 and 3 position respectively. i and ii       ii and iii       i and iii       i, ii and iii
- Which of the following compounds is not an organometallic compound?  
 n-Butyllithium     C<sub>2</sub>H<sub>5</sub>ONa       C<sub>2</sub>H<sub>5</sub>ZnC<sub>2</sub>H<sub>5</sub>     R-C≡CNa
- The reaction of furan with acetic anhydride is  
 electrophilic substitution that takes place at 2 position  
 electrophilic substitution that takes place at 3 position  
 nucleophilic substitution that takes place at 2 position  
 nucleophilic substitution that takes place at 3 position
- 19 Substitution in the general skeleton of a steroid is made at \_\_\_\_\_ ring.  
 A and B ring     B and C ring     C and D ring     Only at D ring
- Aldonic acid is \_\_\_\_\_ derivative of Aldose  
 Monocarboxylic acid                       Dicarboxylic acid  
 Uronic acid                                       Aldehydo acid
- Which of the following statements is correct?  
 Maltose is made from glucoses with β linkage.  
 Lactose is made from glucoses with β linkage.  
 Cellulose is made from glucoses with β linkages.  
 Amylose is made from glucoses with β linkage.
- A Wittig reaction with formaldehyde will produce  
 a primary alcohol                               a secondary alcohol.  
 a larger aldehyde                               a terminal alkene



**Fill in the blanks with appropriate words/symbols.**

16. Reaction of one mole of glucose with 3 moles of phenylhydrazine yields \_\_\_\_\_  
\_\_\_\_\_ (write structural formula).
17. The main product of the reaction between methyl magnesium bromide with ethyl acetate followed by acid work up is \_\_\_\_\_.
18. During the polymerization of polypropylene, if the methyl group alternate regularly, it is called \_\_\_\_\_.
19. During the biosynthesis of fatty acid, acetoacetyl-S-ACP is first converted to \_\_\_\_\_  
\_\_\_\_\_ with the help of NADPH/H<sup>+</sup>.
20. The monomers of glyptal polymer are \_\_\_\_\_.

KATHMANDU UNIVERSITY  
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Level : B.Pharm.  
Year : I  
Time : 2 hrs. 30mins.

Course : CHEM 203  
Semester : II  
F. M. : 55

SECTION "B"  
[55 marks]

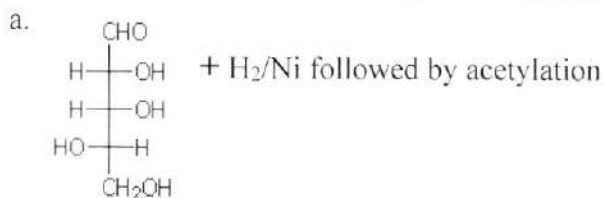
Attempt ALL questions.

1. Give the mechanism for the following reactions. [5 × 2 = 10]
- Polymerization of styrene in presence of peroxide
  - Synthesis of  $\text{CH}_3\text{CH}_2\text{COOH}$  starting with malonic ester
  - Thermal cyclization of butadiene
  - 2  $\text{CH}_3\text{COCH}_3$  in presence of aqueous NaOH



2. Explain the following statements (**ANY FIVE**). [5 × 2 = 10]
- Electrophilic substitution in pyridine occurs less easily than in benzene.
  - (+) Sucrose is non-reducing sugar.
  - [2+2] Cycloaddition reactions occur readily in photochemical condition.
  - Structure of polymers can be explained by considering entropy and enthalpy.
  - Kiliani-Fischer synthesis generates epimers.
  - Enzymatic action of  $\alpha$  chymotrypsin is pH dependent.

3. Give the chemical reactions involved in the following processes (**ANY SIX**). [6 × 2 = 12]

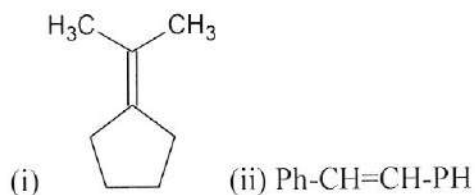


- Conversion of aldopentose to aldotetrose
  - Preparation of amino acid by phthalimidomalonic ester method
  - Boc (tert. Butyloxycarbonyl) anhydride with methyl amine followed by HBr in acetic acid
  - Lauryl alcohol with  $\text{H}_2\text{SO}_4$  followed by aqueous NaOH
  - Cationic and anionic polymerization
  - 2  $\text{CH}_3\text{CH}_2\text{COOC}_2\text{H}_5$  in presence of  $\text{C}_2\text{H}_5\text{OH}/\text{NaOH}$
- 4.
- What happens when pyridine is treated with  $\text{H}_2/\text{Pt}$ ? Compare the basicity between double and triple bonded compounds. [2]

P.T.O.

b. Discuss the acidity of  $\alpha$  hydrogen in  $\text{CH}_2(\text{COOC}_2\text{H}_5)_2$ . What type of reactions is favored by it? [2]

c. Considering Wittig reaction, how can you prepare the following two compounds? [2]



d. 2-Ketohexose reacts with HCN to give A which on hydrolysis gives B. The reaction of B with HI/heat yields C. Identify A, B and C showing necessary chemical equations. [2]

e. Write down the chemistry of phospholipid mentioning its role in cell membrane. [2]

f. How can the chain length of a polysaccharide be determined? [3]

**OR**

How can you prove that [1,3] sigmatropic shift of hydrogen is not common but [1,5] occurs? Show it with the help of detailed reactions.

5. Write short notes on (**ANY FOUR**). [4 × 2.5 = 10]

- Synthesis of peptides
- Chemistry and quality of soap
- Cycloaddition reactions
- Coordination polymerization
- Nucleophilic substitution in pyridine

