REV-01
MSC/32/37

2025/05

SET A

M.Sc. CHEMISTRY
SECOND SEMESTER
ORGANIC CHEMISTRY-II
MSC – 201

[USE OMR FOR OBJECTIVE PART]

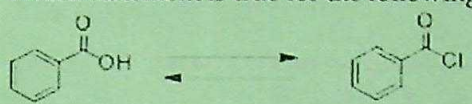
Duration: 3 hrs. **Full Marks: 70**

Objective

Time: 30 min. **Marks: 20**

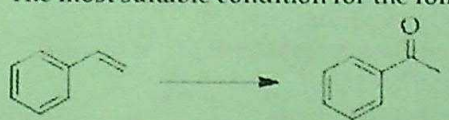
Choose the correct answer from the following: ***1×20=20***

1. Which statement is true for the following reactions?



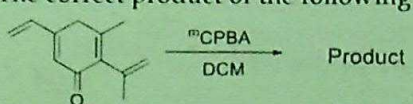
a. Forward reaction is a reduction reaction & backward reaction is an oxidation reaction
b. Forward reaction is an oxidation reaction & backward reaction is a reduction reaction.
c. Both the forward & backward reactions are non-redox, substitution reactions.
d. Both the reactions are redox reactions

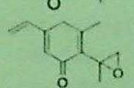
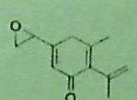
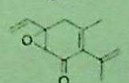
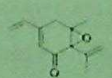
2. The most suitable condition for the following reaction is



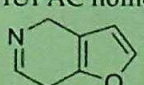
a. $Hg(OAc)_2$& H_2O
b. PCC oxidation
c. PDC oxidation
d. Wacker Oxidation

3. The correct product of the following reaction is



a. 
b. 
c. 
d. 

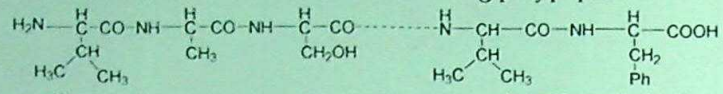
4. IUPAC nomenclature of the given molecule is



a. 1,4-dihydrofuro[3,2-c]pyridine
b. 4,7-dihydrofuro[3,2-c]pyridine
c. 4,7-dihydrofuro[2,3-c]pyridine
d. 1,4-dihydrofuro[2,3-c]pyridine

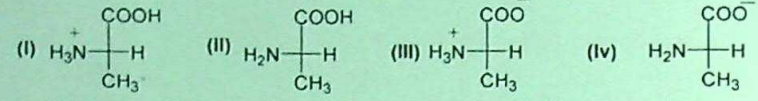
5. The nitration of pyridinium-N-oxide occurs
   a. at α-carbon regio-specifically
   b. at β-carbon regio-specifically
   c. at γ-carbon regio-specifically
   d. non-regio-specifically

6. The C-terminal amino acid in the following polypeptide is



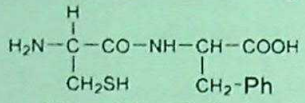
   a. Glycine
   b. Phenyl alanine
   c. Valine
   d. Serine

7. In the titration curve of alanine during electrophoresis, which of the following is the major structure of solute species in a solution of alanine at pH =2?



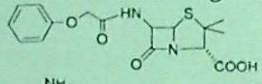
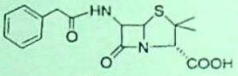
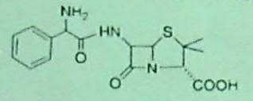
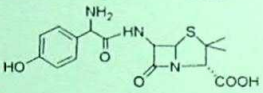
   a. Structure (I)
   b. Structure (II)
   c. Structure (III)
   d. Structure (IV)

8. The name of the following dipeptide is



   a. Phenylalanyl glycine
   b. Cysteinyl phenylalanine
   c. Phenylalanyl cystein
   d. Glycyl alanine

9. Which of the following structures represents ampicillin?

   a. 
   b. 
   c. 
   d. 

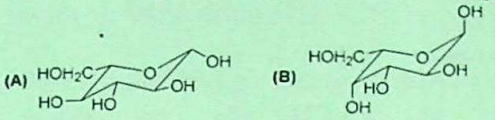
10. Treatment of penicillin with methanol results in the formation of
    a. Penicillamine
    b. methyl penaldate
    c. methyl penicilloate
    d. penilloaldehyde.

11. Which of the following will exhibit reducing properties
    a. α-ethyl glucoside
    b. β-lactose
    c. β-methyl maltoside
    d. Sucrose

12. Which of the following statement is not correct
    a. Starch is a mixture of two polymers.
    b. Cellulose is a polymer of glucose linked by β-1–4 glycosidic linkage.
    c. Chitin is a polymer of N-acetyl glucosamine.
    d. Glycogen is an animal sugar structurally similar to amylose.

13. α and β-maltoses are
    a. enantiomers
    b. epimers
    c. anomers
    d. geometrical isomers

14. The following molecules A and B, are respectively:

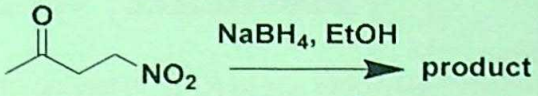


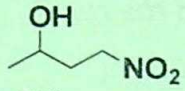
a. α-glucose and β-mannose
b. α-mannose and β-galactose
c. β -glucose and α galactose
d. α-glucose and β-galactose

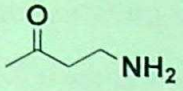
15. Which of the following statement is **not correct** about glycolysis?

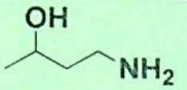
a. Produce 3 NADH and 1 $FADH_2$
b. Overall process is an exergonic process.
c. There is a net production of 2 equivalent of ATP.
d. Pyruvate is the final product of glycolysis

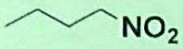
16. Choose the correct product of the following reaction



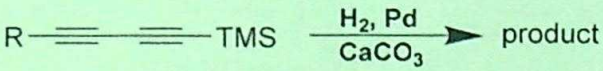
a. 

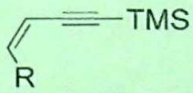
b. 

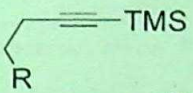
c. 

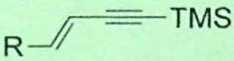
d. 

17. What will be the product of the following reaction



a. 

b. 

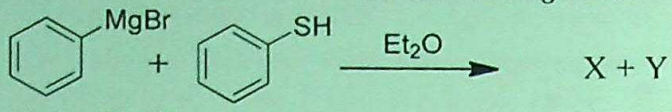
c. 

d. 

18. Borane is highly.....*Fill the blanks*
a. Nucleophilic
b. Electrophilic
c. Hydrophobic
d. Electronegative

19. The co-ordination number of Rh-metal at Wilkinson catalyst is
a. 2
b. 4
c. 6
d. 8

20. Write down the correct X and Y of the following reaction



a. X = Ph-CH_3
   Y = PhSMgBr

b. X = CH_3MgBr
   Y = Ph-Ph

c. X = Ph-H
   Y = PhSMgBr

d. All of the above

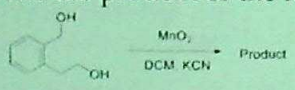
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Descriptive

Time : 2 hrs. 30 mins. **Marks : 50**

[Answer question no.1 & any four (4) from the rest]

1. a. Write the product of the following reaction with justification **2+3+2+3 =10**

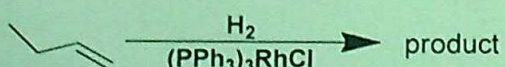


b. Describe the structure activity relationship of streptomycin.

Match the columns

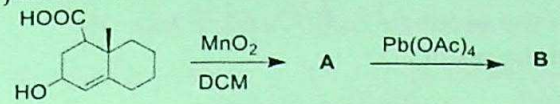
Co-enzyme	Enzyme
1. NADPH	A. α-keto acid decarboxylase
2. TPP	B. α-amino acid decarboxilase
3. PLP	C. acyl transferase
4. CoASH	D oxidoreductase

c. Write down the structure of Wilkinson's catalyst. What is the detailed mechanism involved in the following reduction reaction?

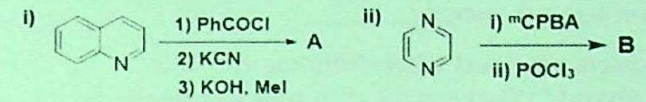


2. a. Explain the Prevost's and Woodward's dihydroxylation reactions with suitable examples. 6 **6+4=10**

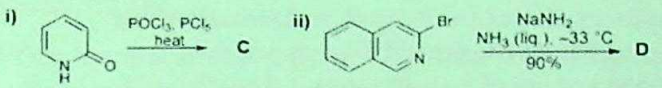
b. Write down the products (**A** &**B**) of the following reaction with justification. 4



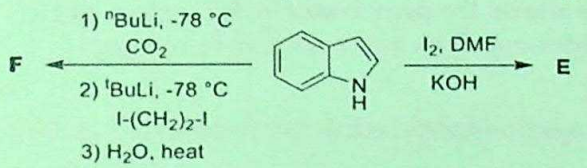
3. a. Write down the products (A & B) and show the reaction mechanism. **4+4+2 =10**



b. Write down the products (C & D) of the following reactions with mechanism.

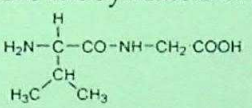


c. Identify the products (E & F) of the following reactions.



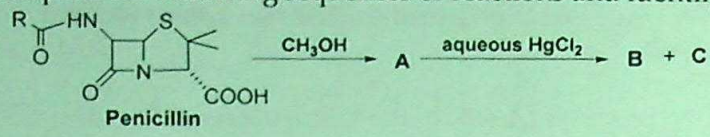
4. a. What is Strecker's synthesis of amino acids? Write its mechanism. **3+2+3+2 =10**

b. Give the synthesis of the following dipeptide.



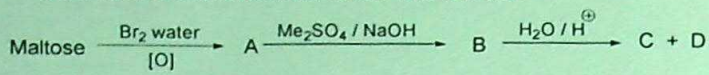
c. What is N-terminal residue analysis? Describe a method of determining N-terminal residue of a polypeptide chain.

d. Complete the following sequences of reactions and identify them.



Penicillin

5. a. Write down the structure of the products A, B, C and D. Indicate structural information from the result. 4+3+3 =10



b. What do you understand by mutarotation? Explain why maltose undergo mutarotation but not sucrose.

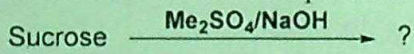
c. Write down the products obtained when fully methylated amylopectin is hydrolysed? What are the different informations obtained from the result about the structure of amylopectin.

6. a. α-maltose show specific rotation of (+) 168° and β-maltose (+) 112°. Both these anomers of glucose exhibit mutarotation and specific rotation shown when the equilibrium is reached is (+) 136°. Calculate the percentage of α-maltose and β-maltose at equilibrium. 2×5=10

b. Chemical tests of glucose shows the presence of -CHO group, but IR spectrum of glucose does not show any peak due to carbonyl group. Give reason.

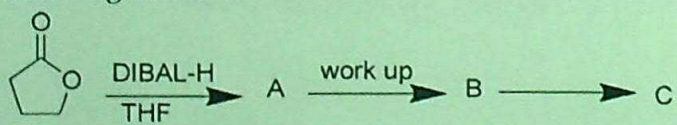
c. Write down Haworth projection for (i) lactose (ii) β-methyl glucoside.

d. Complete the following reaction. Write down the structure and name of the reactant and the product (use Haworth projections).

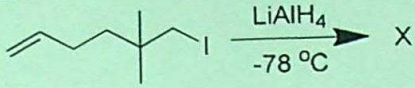


e. What are coupled reactions? Illustrate with example.

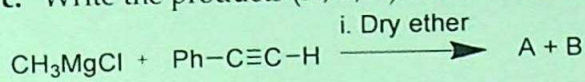
7. a. Write down the structure of the products A, B and C in the following reaction 3+4+3 =10

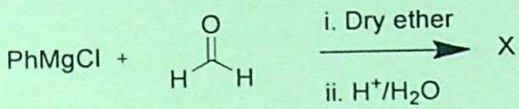


b. What will be the major product (X) of the following reaction and show the mechanism



c. Write the products (A, B, X) of the following reactions.

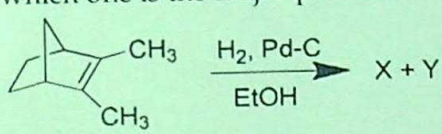




8. a. Explain the mechanism of action of chloramphenicol. **2+3+2+3 =10**

b. Discuss the synthesis of penicillin-G starting from D-penicillamine.

c. What are the products (X and Y) of the following reaction, and which one is the major product?



d. Write a short note on Birch Reduction.

= = *** = =