

M.Sc. CHEMISTRY  
SECOND SEMESTER  
ORGANIC CHEMISTRY  
MSC – 201 [REPEAT]  
[USE OMR FOR OBJECTIVE PART]

**SET  
A**

Duration: 3 hrs.

Full Marks: 70

Time: 30 min.

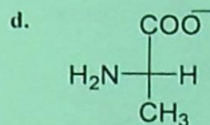
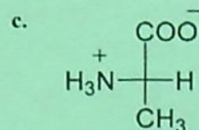
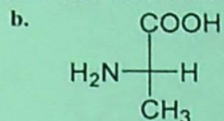
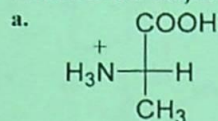
( Objective )

Marks: 20

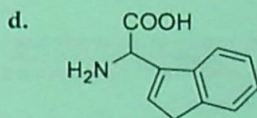
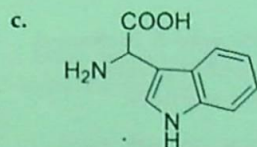
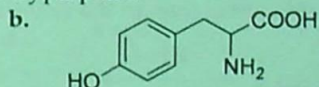
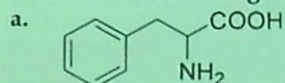
Choose the correct answer from the following:

1×20=20

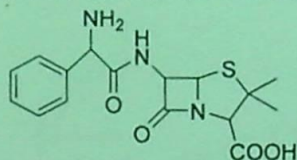
1. Which is the major structure of solute species in a solution of alanine. CO<sub>2</sub> at pH < 2?



2. Which of the following structures represents tryptophan?



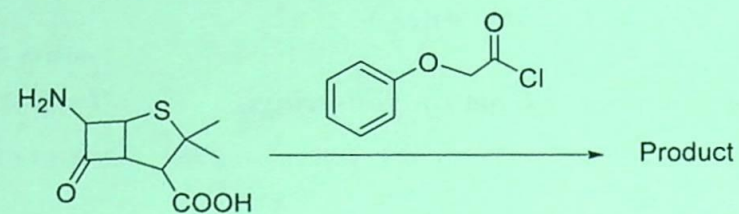
3. Give the name of the antibiotic represented by the following structure



- a. Penicillin  
c. Ampicillin

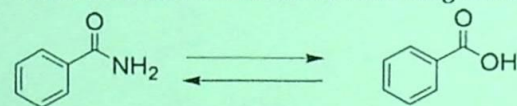
- b. Streptomycin  
d. Amoxicillin

4. Which of the following mixture of compounds is obtained when penicillin is hydrolysed with strong inorganic acid?
- Penicillamine and Penilloic acid
  - Penilloic acid and penilloaldehyde
  - Phenyl amine and penilloaldehyde
  - Penicillamine and penilloaldehyde
5. The product of the following reaction is

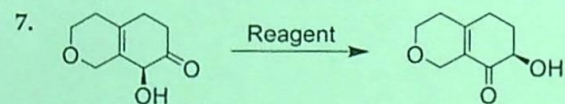


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6. Which statement is true for the following reactions?

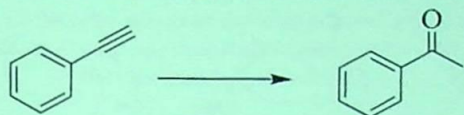


- Forward reaction is an oxidation reaction & backward reaction is a reduction reaction.
- Both the forward & backward reactions are non-redox, substitution reactions.
- Forward reaction is a reduction reaction & backward reaction is an oxidation reaction
- Both the reactions are redox reactions.



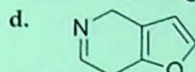
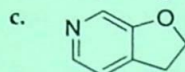
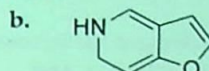
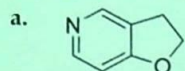
- PCC
- IBX
- SeO<sub>2</sub>
- Al(O<sup>i</sup>Pr)<sub>3</sub>

8. The most suitable condition for the following reaction is

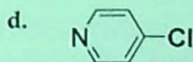
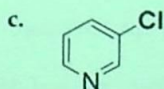
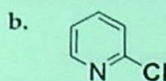
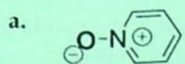
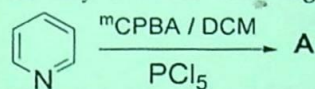


- a. PCC oxidation  
 b.  $\text{Hg}(\text{OAc})_2$  &  $\text{H}_2\text{O}$   
 c. Wacker Oxidation  
 d. PDC oxidation

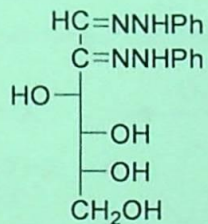
9. The structure of 4,7-dihydrofuro[3,2-c]pyridine is



10. Identify 'A' of the following reaction

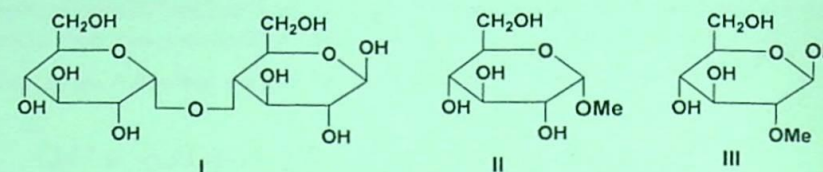


11. A given monosaccharide form the following osazone on treatment with excess of phenyl hydrazine.



- a. Glucose  
 b. Mannose  
 c. Fructose  
 d. Any of the these

12. Which of the following will show reducing properties?



- a. I & II  
b. I & III  
c. II & III  
d. All three

13. Which is a correct statement for lactose

- a. a disaccharide of galactose and glucose with  $\alpha$ -1-4 glycosidic linkage  
b. a disaccharide of glucose and galactose with  $\alpha$ -1-4 glycosidic linkage  
c. a disaccharide of galactose and glucose with  $\beta$ -1-4 glycosidic linkage  
d. a disaccharide of glucose and galactose with  $\beta$ -1-4 glycosidic linkage

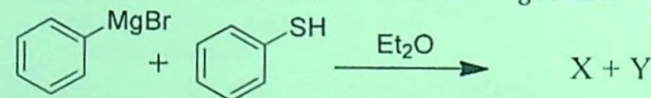
14. Which of the following statement is not correct

- a. Starch is a mixture of two polymers  
b. Amylose is a polymer of glucose linked by  $\beta$ -1-4 glycosidic linkage  
c. Glycogen is an animal sugar structurally similar to amylopectin  
d. Chitin a polymer of N-acetyl glucosamine

15. PEP converts to pyruvate ( $\Delta G = -62.5$  kJ/mol) by coupling with ADP and produce ATP ( $\Delta G = +30.5$  kJ/mol). Choose the correct statement.

- a. The process is exergonic and  $\Delta G = -31.5$  kJ/mole.  
b. The process is exothermic and  $\Delta H = -32.0$  kJ/mole.  
c. The process is exergonic and  $\Delta G = -32.0$  kJ/mole.  
d. The process is endergonic and  $\Delta G = +32.0$  kJ/mole.

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

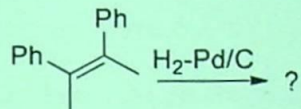


- a. X = Ph-CH<sub>3</sub>  
Y = PhSMgBr  
b. X = CH<sub>3</sub>MgBr  
Y = Ph-Ph  
c. X = Ph-H  
Y = PhSMgBr  
d. No reaction

17. In Cram's modification of Wolff-Kishner reaction

- a. DMSO replaced glycol  
b. DMF replaced glycol  
c. DMA replaced glycol  
d. SOCl<sub>2</sub> replaced glycol

18. In Shapiro reaction the major product formed is
- a. Thermodynamically controlled
  - b. Kinetically controlled
  - c. Hydrothermally controlled
  - d. None of the above
19. The geometry of Wilkinson's catalyst is coordination geometry
- a. trigonal planar
  - b. square planar
  - c. square pyramidal
  - d. tetrahedral
20. The product of the following reaction is



- a. Meso product
- b. Racemic product
- c. Diastereomeric product
- d. All of these

**( Descriptive )**

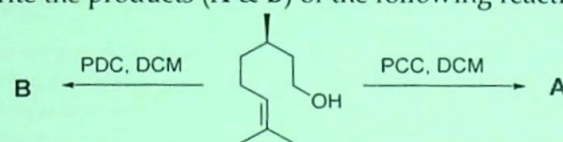
Time : 2 hrs. 30 mins.

Marks : 50

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

1. a. Write the products (A & B) of the following reactions.

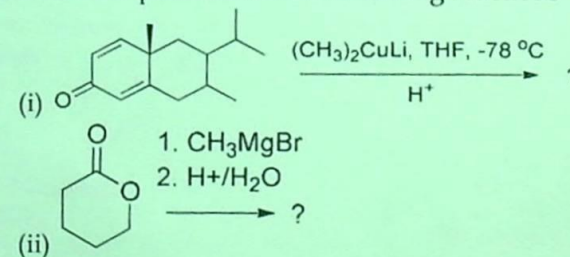
2+2+3+3  
=10



- b. Match the columns:

Co-enzyme	Vitamin
1. NADPH	A. vit-B-1
2. TPP	B. vit-B-2
3. FAD	C. vit-B-5
4. CoASH	D. vit-B-3

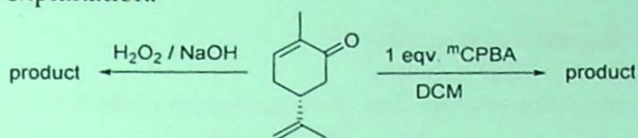
- c. Write down the products of the following reactions



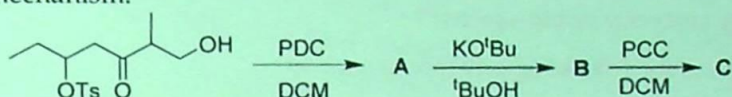
- d. Discuss the structure activity relationship of Chloramphenicol.

2. a. Write down the products of the following reactions with explanation.

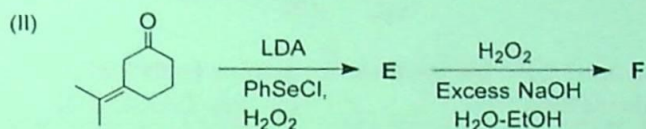
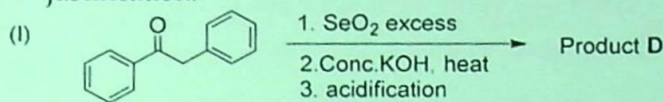
3+3+4  
=10



- b. Identify the A, B & C of the following reaction with reaction mechanism.

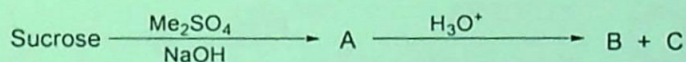


- c. Write the products (D, E, F) of the following reactions with justification.



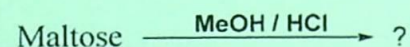
3. a. Why in aq. solution of glucose,  $\beta$ -glucose is found to be present in higher concentration compared to  $\alpha$ -glucose? But when methyl glucoside is prepared from glucose,  $\alpha$ -methyl glucoside is found to be formed in higher concentration compared to its  $\beta$ -isomer.
- b. Complete the following. Mention what information you will get about the structure of sucrose?

3+4+3  
=10

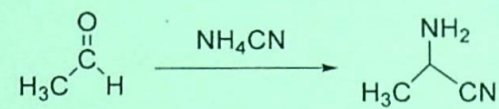


- c. An unknown disaccharide was methylated with methyl iodide and then hydrolysed. The two products obtained were - 2, 3, 4, 6- tetramethyl-D-galactose and 2, 3, 6-trimethyl-D-glucose. Draw Haworth structures and name the disaccharide and the glycosidic linkage.

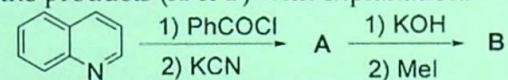
4. a. Explain why hydrolysis of sucrose is known as inversion of sucrose? 2×5=10
- b. Write down conformational structure for (i) β-methyl maltoside (ii) α-galactose
- c. Write down the reactions of oxidation of sucrose with periodic acid.
- d. Write down the structure of ATP. Why it is considered as the energy currency of bio-system?
- e. Complete the following reactions -



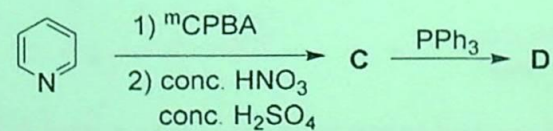
5. a. What is Strecker's synthesis? Write the mechanism of the following reaction. 3+4+3=10



- b. What is transamination? Give the synthesis of alanine from valine by using this method.
- c. Describe a method for the determination of N-terminal residue of a polypeptide chain.
6. a. Identify the products (A & B) with explanation. 3+3+4=10

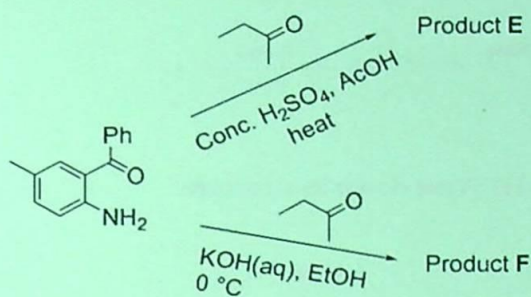


- b. Write down the products (C & D) of the following reactions





c. What will be E & F? Justify your answer.

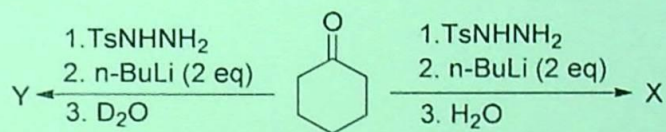


7. a. What are  $\beta$ -lactam antibiotics? Give two examples.

2+3+2+3  
=10

b. Draw the structure of 6-aminopenicillanic acid. Starting from this compound write the synthesis of penicillin-G.

c. Write down the product X and Y, and show the mechanism of the following reaction

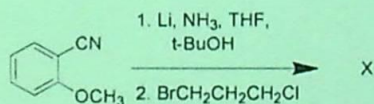


8. a. Describe the reaction mechanism involved in the reduction via Wilkinson's catalyst. Show the oxidative addition and reductive elimination steps.

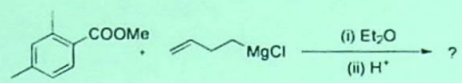
4+3+3  
=10

b. Write down the major product of the following reactions

(i)



(ii)



c. What is DIBAL-H? Write down its structure.

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