

**M.Sc. CHEMISTRY
THIRD SEMESTER
ORGANIC CHEMISTRY-III
MSC-301**

Duration: 3 Hrs.

Marks: 70

PART : A (OBJECTIVE) = 20
PART : B (DESCRIPTIVE) = 50

[PART-B : Descriptive]

Duration: 2 Hrs. 40 Mins.

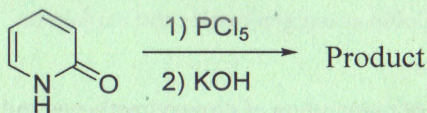
Marks: 50

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

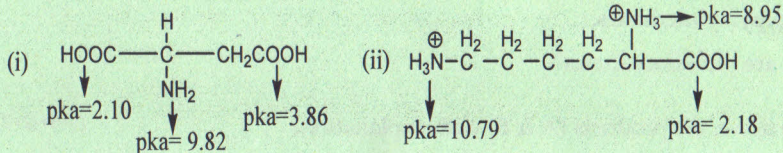
1. Answer the following questions:

(2×5=10)

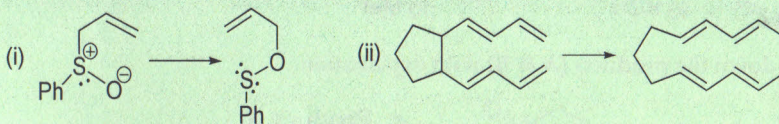
- (a) Explain, what do you mean by inversion of sucrose?
- (b) Discuss the role of Chlorophyll in photosynthesis.
- (c) Write down the product of the following reaction with mechanism.



(d) Find the iso-electric point of the following amino acids.

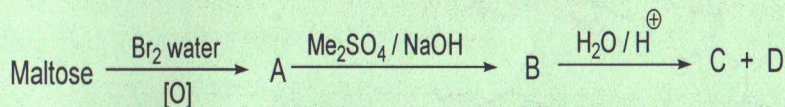


(e) Find out the order of following sigma tropic rearrangements:



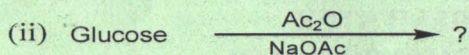
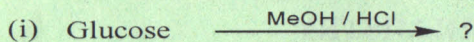
2. (a) Write down the structure of the products A, B, C and D.

(5+3+2=10)



What information you can get from this result about the structure of maltose.

(b) Complete the following reactions:



(c) Write down the products of oxidation reaction of sucrose with periodic acid.

3. (a) What is Ninhydrin reagent and what is its use? Explain with suitable example. (3+3+4=10)

(b) What do you mean by sequencing of amino acid? What is the method used for N-terminal sequence determination of amino acids in a peptide chain?

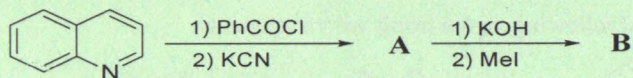
(c) What is secondary structure of protein and how it is classified? Explain any one of the stable arrangements of secondary structure of protein.

4. (a) Discuss the role of hemoglobin as oxygen carrier and explain its oxygen binding mechanism. (4+(3+2)+1=10)

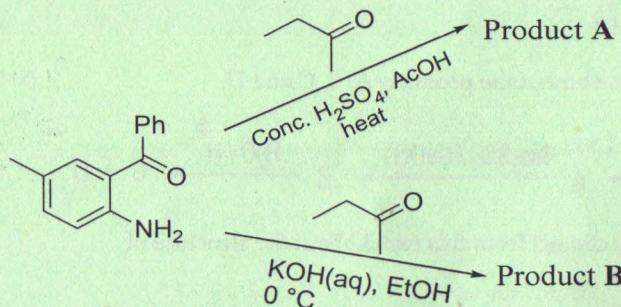
(b) Explain various methods of preparation of dipyrromethenes and hence suggest at least one useful method to synthesize porphyrin from dipyrromethenes.

(c) What are phthalocyanines?

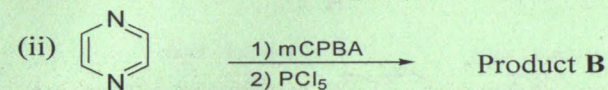
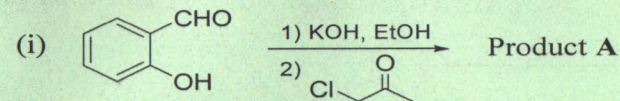
5. (a) Write down the products (A & B) with explanation. (3+3+(2+2)=10)



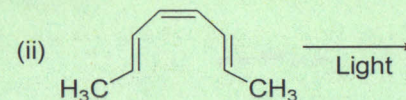
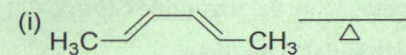
(b) Write down the products (A & B) with explanation.



(c) Write down the products (A & B) for the following reactions.



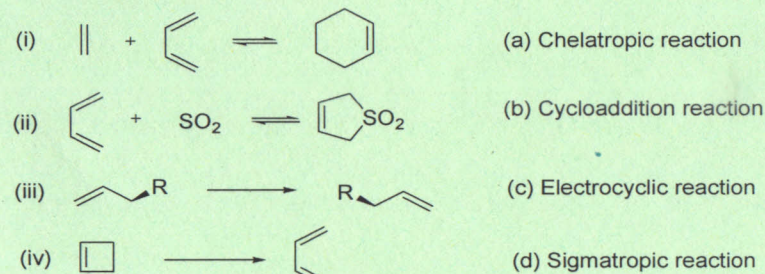
6. (a) Predict the products of the following reactions: (2+2+2+4=10)



(b) What is 1, 3-dipole? Give example of it.

(c) Why [2+2] cycloaddition reaction does not take place under thermal condition? Explain.

(d) Match the following:



7. (a) α -maltose show specific rotation of (+) 168° and β -maltose (+) 118° . (2+3+3+2=10)

Both these anomers of maltose exhibit mutarotation and specific rotation shown when the equilibrium is reached is (+) 136° . Calculate the percentage of α -maltose and β -maltose at equilibrium.

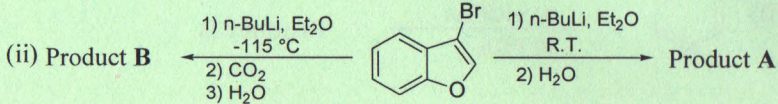
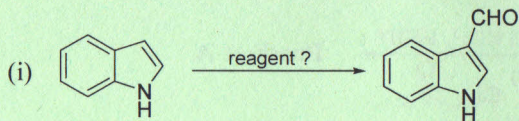
(b) Write a note on structural differences between starch and cellulose.

(c) Show by the correlation diagram that the thermal Diels Alder reaction is an allowed cycloaddition reaction.

(d) What is Ene reaction? Explain with suitable example.

8. (a) Write down the reagent and the products for following reactions:

(2+3=5)



(b) Explain the linkage of peptide. How the tripeptide Gly-Ala-Gly can be synthesized? Explain with suitable reactions.

(2+3=5)

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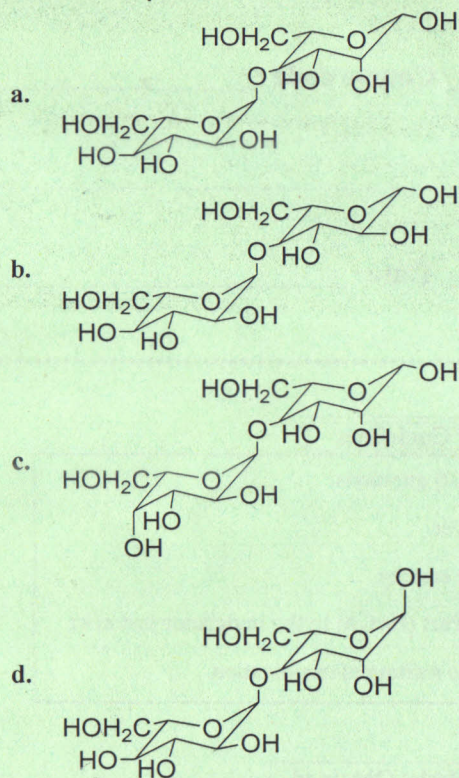
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[PART-A : Objective]

Choose the correct answer from the following:

1×20=20

1. Structure of β -maltose is:



2. 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.

3. Which of the following will not form an osazone?

- a. Maltose b. Fructose c. Sucrose d. Lactose

4. Glucose and mannose are:

- a. enantiomers b. epimers c. anomers d. none of these

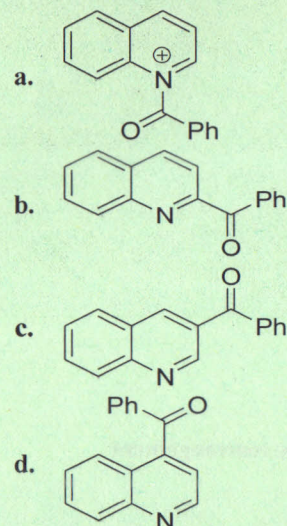
5. Which is a correct statement for lactose?

- a. A disachharide of galactose and glucose with α -1-4 glycosidic linkage.
b. A disachharide of glucose and galactose with α -1-4 glycosidic linkage.
c. A disachharide of galactose and glucose with β -1-4 glycosidic linkage.
d. A disachharide of glucose and galactose with β -1-4 glycosidic linkage.

6. Electrophilic substitution reaction of N-alkylated-pyridine occurs regio-specifically at:

- a. α -carbon b. β -carbon
c. γ -carbon d. non-regio-specific

7. Quinoline reacts with benzoylchloride to give:



8. Chichibabin reaction of pyridine gives the product of:

- a. C-alkylation b. C-hydroxylation
c. C-amination d. C-nitration

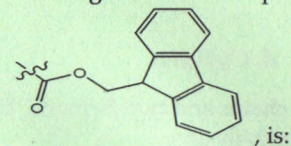
9. Regio-selective nitration of indole at β -carbon can be obtained by using:

- a. Conc. HNO_3 b. mixture of Conc. HNO_3 and Conc. H_2SO_4
c. Conc. HNO_3 and Ac_2O d. PhCOONO_2

10. When the amino acid alanine is added to a solution with a pH of 7.3, it becomes:

- a. A cation b. Non polar
c. An isotope d. A zwitter ion

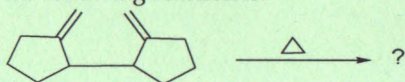
11. The reagent used for deprotection of the following protecting group:



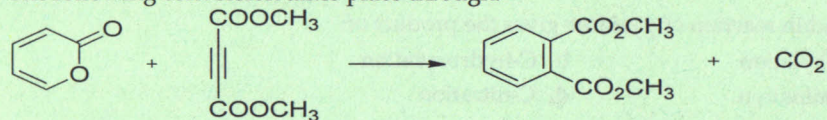
- a. Hydrofluoric acid b. Piperidine
c. H_2 and a Pd charcoal catalyst d. Trifluoroacetic acid



12. The α -helix rises per turn a distance of:
 a. 0.54 nm b. 1.5 nm c. 3.0 nm d. 1.83 nm
13. Which of the following is a set of hydrophobic amino acids?
 a. Arginine-Lysine-Methionine b. Aspartic acid-Valine- Isoleucine
 c. Histidine-Proline-Glutamine d. Valine-Methionine-Isoleucine
14. The Claisen rearrangement is:
 a. [1,5] sigmatropic rearrangement b. [3,3] sigmatropic rearrangement
 c. [1,3] sigmatropic rearrangement d. None of the these
15. The product of the following reaction is:



- a.
- b.
- c.
- d. None of these
16. Sommelet Hauser rearrangement takes place through:
 a. [3,3] sigmatropic rearrangement b. [2,3] sigmatropic rearrangement
 c. [1,3] sigmatropic rearrangement d. None of these
17. The following conversion takes place through:



- a. [4+2] Cycloaddition reaction b. [2+2] Cycloaddition reaction
 c. [8+2] Cycloaddition reaction d. None of these
18. Which is not the correct statement as regards to binding of hemoglobin with ligands?
 a. Oxyhemoglobin is extremely stable and the coordination is irreversible.
 b. Oxyhemoglobin is stable and the coordination is reversible.
 c. Coordination is irreversible in case of cyanide ion.
 d. Cyanide ion has much higher affinity to bind with Fe than that of Oxygen.
19. The correct molecular formula of Porphin is:
 a. $C_{20}H_{14}N_4$ b. $C_{20}H_{12}N_4$ c. $C_{18}H_{20}N_4$ d. $C_{22}H_{20}N_4$
20. The four protein chains of hemoglobin comprises of two α chains and two β chains. The number of residues of each of the two chains α and β respectively are:
 a. 141 and 146 b. 142 and 145 c. 140 and 147 d. 150 and 151

Course :

Semester : Roll No :

Enrollment No : Course code :

Course Title :

Session : 2017-18 Date :

Instructions / Guidelines

- The paper contains twenty (20) / ten (10) questions.
- Students shall tick (✓) the correct answer.
- No marks shall be given for overwrite / erasing.
- Students have to submit the Objective Part (Part-A) to the invigilator just after completion of the allotted time from the starting of examination.

Full Marks	Marks Obtained
20	

Scrutinizer's Signature

Examiner's Signature

Invigilator's Signature