

Write the following information in the first page of Answer Script before starting answer

ODD SEMESTER EXAMINATION: 2020-21

Exam ID Number _____

Course _____ Semester _____

Paper Code _____ Paper Title _____

Type of Exam: _____ (Regular/Back/Improvement)

Important Instruction for students:

1. Student should write objective and descriptive answer on plain white paper.
2. Give page number in each page starting from 1st page.
3. After completion of examination, Scan all pages, convert into a single PDF, rename the file with Class Roll No. **(2019MBA15)** and upload to the Google classroom as attachment.
4. Exam timing from 10am – 1pm (for morning shift).
5. Question Paper will be uploaded before 10 mins from the schedule time.
6. Additional 20 mins time will be given for scanning and uploading the single PDF file.
7. Student will be marked as ABSENT if failed to upload the PDF answer script due to any reason.

M.Sc. CHEMISTRY
THIRD SEMESTER
ORGANIC CHEMISTRY-III
MSC-302

Duration : 3 hrs.

Full Marks : 70

(PART-A : Objective)

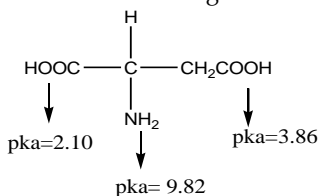
Time : 20 min.

Marks : 20

Choose the correct answer from the following:

1X20=20

- Which of the following essential amino acids is not synthesized by the body?
 - Arginine
 - Glutamine
 - Histidine
 - Proline
- Sanger's reagent is:
 - 2,4-Dinitrofluorobenzene
 - Phenylisothiocyanate
 - 2,4-Dinitrophenyl hydrazine
 - Ninhydrin
- The isoelectric point of the following amino acid is



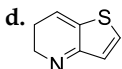
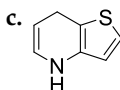
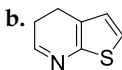
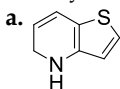
- 5.96
 - 6.84
 - 2.98
 - None of these
- The α -helix structure of protein rises per unit turn a distance of:
 - 0.54 nm
 - 1.5 nm
 - 3 nm
 - 1.83 nm
 - Sulphur containing amino acids are:
 - Cystein and metheonine
 - Metheonine and threonine
 - Cystein and threonine
 - Cystein and serine
 - Which of the following will exhibit mutarotation?
 - Maltose
 - Sucrose
 - β -O-methyl maltoside
 - α -ethyl fructoside
 - Which of the following sugars will reduce Tollens reagent?
 - Sucrose
 - β -maltose
 - α -O-methyl lactoside
 - 4- β -glucopyranosyl α -methyl-D-glucopyranoside
 - Which of the following pairs of monisaccharides will not form the same osazone?
 - Glucose & Mannose
 - Glucose & fructose
 - Glucose & galactose
 - Ribose & arabinose

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

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

10. The correct structure of the following compound-

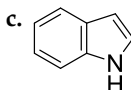
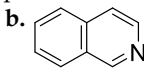
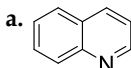
4,5-dihydrothieno[3,2-b]pyridine is:



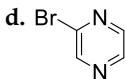
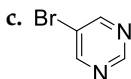
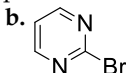
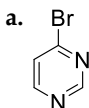
11. Chichibabin reaction of isoquinoline gives the product of:

- a. C1-alkylation b. C1-amination
c. C2-alkylation d. C2-amination

12. The most reactive compound towards electrophilic substitution reaction is:



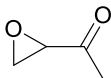
13. The most reactive compound towards nucleophilic substitution reaction is:



14. Paternò-Büchi reaction gives a cyclic ether of:

- a. Three membered ring b. Four membered ring
c. Five membered ring d. Six membered ring

15. The major product obtained from the following molecule under photochemical reaction condition will be *via*

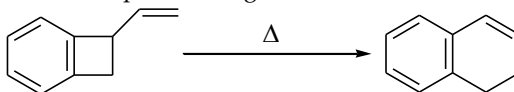


- a. α -cleavage b. β -cleavage (C-C bond)
c. β -cleavage (C-O bond) d. γ -H abstraction

16. Pyruvate is fed in TCA cycle as:

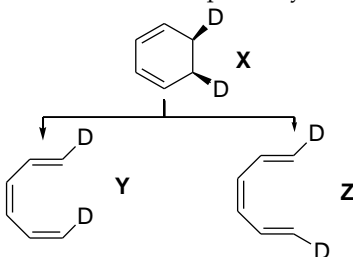
- a. Acetyl CoA b. Acetic acid
c. Co-enzyme A d. Oxal acetate

17. The following conversion take place through



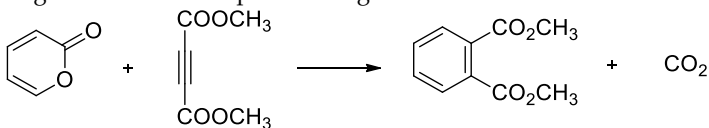
- a. 4π disrotation and 6π conrotation b. 4π conrotation and 6π disrotation
 c. 4π disrotation and 6π disrotation d. 6π conrotation and 4π disrotation

18. The product Y and Z are formed respectively from X



- a. $h\nu$, conrotatory opening & Δ disrotatory opening b. $h\nu$, disrotatory opening & Δ conrotatory opening
 c. Δ , conrotatory opening & $h\nu$ disrotatory opening d. Δ , disrotatory opening & $h\nu$ conrotatory opening

19. 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

20. The ground state HOMO of 1, 3, 5 - hexatriene has:

- a. Plane of symmetry b. Axis of symmetry
 c. Both a & b d. None of these

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(PART-B : Descriptive)

Time : 2 hrs. 40 min.

Marks : 50

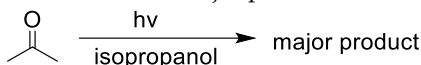
[Answer question no.1 & any four (4) from the rest]

1. a) Write down the products (A & B) of the following reactions 2



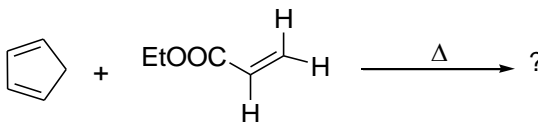
- b) What do you mean by isoelectric point of an amino acid? 2

- c) Write down the major product of the following reaction: 1

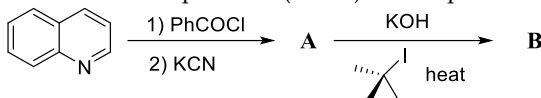


- d) Write down the structure of ATP. Why it is known as energy currency? 3

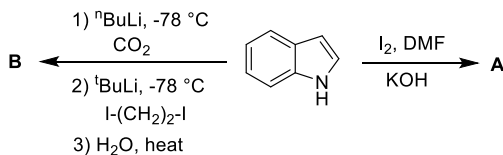
- e) For the Diels Alder reaction predict the product with appropriate geometry. 2



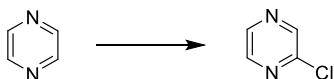
2. a) Write down the products (A & B) with explanation. 4



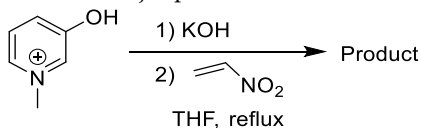
- b) Identify the products A & B. Suggest the mechanistic route of the product formation. 4



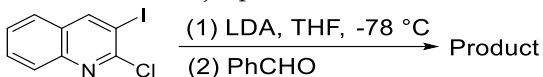
- c) Write the suitable reaction condition for the following transformation: 2



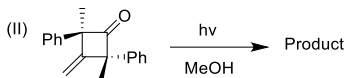
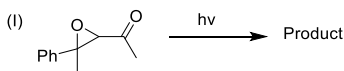
3. a) Write down the major product with mechanism. 2



b) Write down the major product with mechanism. 3



c) Write down the major products with mechanism of the following reactions. 5



4. a) How α -amino acid can be synthesized by Gabriel Malonic ester synthesis method? Explain with suitable reaction involved. 3

b) What do you mean by sequencing of peptides? Explain any one method for N-terminus determination of peptides. 4

c) What are the different forms exist in secondary structure of protein? Explain. 3

5. a) What is ninhydrin test and what is its use? Explain with suitable examples. 2

b) Write down the steps involved in the solid phase synthesis of the tripeptide Ala-Phe-Gly. 3

c) What do you mean by coupled reactions? 2

d) Give a short account of, how biological oxidation of glucose generates ATP molecules? 3

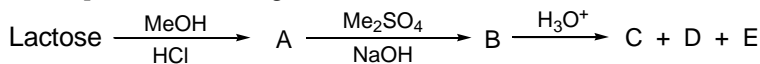
6. a) Chemical tests of glucose shows the presence of $-\text{CHO}$ group, but IR spectrum of glucose does not show any peak due to carbonyl group. Give reason. 2

b) α -maltose show specific rotation of $(+)$ 168° and β -maltose $(+)$ 118° . Both these anomers of maltose exhibit mutarotation and specific rotation shown when the equilibrium is reached is $(+)$ 136° . 2

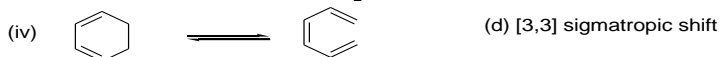
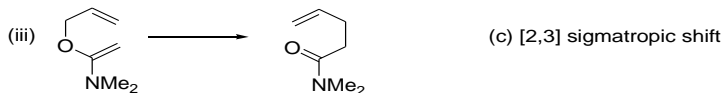
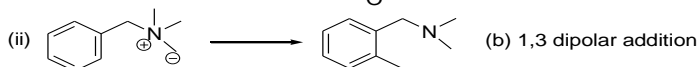
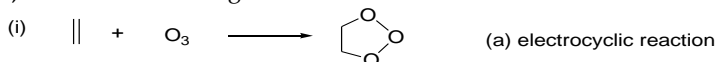
Calculate the percentage of α -maltose and β -maltose at equilibrium.

c) Glucose react with NH_2OH to form glucose oxime but glucose penta-acetate does not form its corresponding oxime. Explain. 2

d) Complete the following. Give structures of all the molecules involved. 4

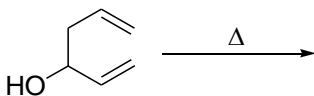


7. a) Match the following: 2



b) Write down the product formed in the following:

2

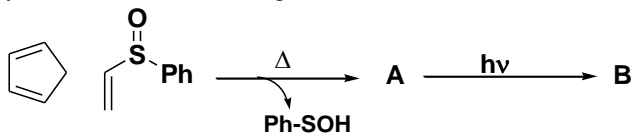


c) Discuss FMO theory of (4+2) cyclo-addition reactions.

3

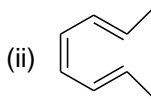
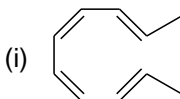
d) Identify A and B in the following.

3



8. a) Write down the product formed when each of the following compounds undergo an electrocyclic reaction - under thermal condition.

3

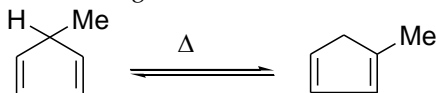


b) What is ene-reaction? Explain with suitable example.

2

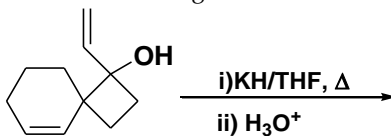
c) What is cope rearrangement? What type of sigmatropic reaction is shown by the following?

2



d) Predict the product formed in the following reaction with mechanism:

3



== *** ==