

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -3 EXAMINATIONS- 2023
B.Tech-III Semester (BT)

COURSE CODE (CREDITS): 18B11BT314 (3)
COURSE NAME: GENERAL CHEMISTRY
COURSE INSTRUCTORS: Dr. Gopal Singh Bisht

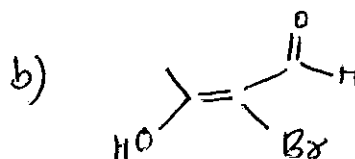
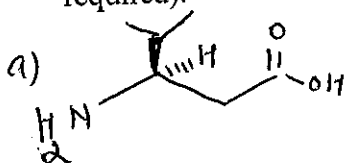
MAX. MARKS: 35

MAX. TIME: 2 Hours

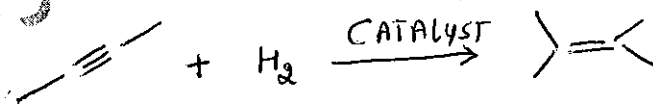
Note: (a) All questions are compulsory. This paper contains two pages.
(b) Marks are indicated against each question in square brackets.
(c) The candidate is allowed to make suitable numeric assumptions wherever required for solving problems

Q1. Answer the following questions. (Any Five) [2 x 5=10] [CO V]

- a) 250 g of an HCl solution of relative density 1.17 contains 62 g of HCl. What volume of this HCl solution will be required to exactly neutralize 2.0 liters of 0.2N NaOH solution? (Final solution can be rounded off to one decimal place)
- b) The specific rotation of (R)-(-)-2-bromooctane is -36° . What is the percentage composition of a mixture of enantiomers of 2-bromooctane whose rotation is $+18^\circ$?
- c) Draw the Fischer projection for (S)-2-bromobutane and convert it to its flying wedge formula.
- d) Give systematic name of following compounds. Identify the stereogenic centre present in compounds and how many stereoisomers possible (assign R/S or E/Z wherever required).



- e) Consider the following reaction and predict whether an increase in temp will favor reactant or products. Justify your predictions.

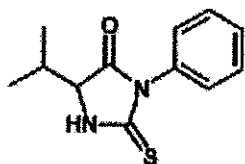


- f) Show all steps necessary to make the dipeptide Phe-Ala from L-phenylalanine and L-alanine.

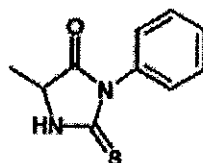
Q2a). What happens when β -D-glucopyranose react with a) CH_3OH , HCl b) HNO_3 , H_2O heat c) Excess CH_3I , Ag_2O followed by H_3O^+ [3] [COIV]

Q2b). Explain Mutarotation by writing proper chemical reactions. [2] [COIV]

Q3a). Treatment of a tripeptide with phenyl isothiocyanate yields compound A and a dipeptide. Treatment of the dipeptide with phenyl isothiocyanate yields compound B and glycine. Identify the structure of the starting tripeptide. [2][COIV]



Compound A



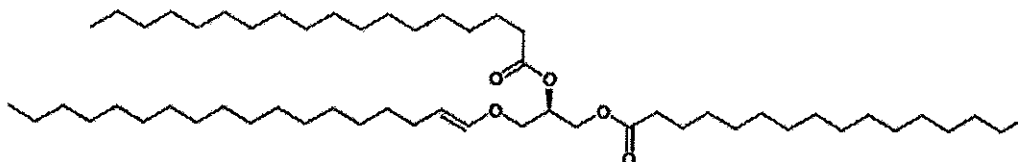
Compound B

Q3b). Show how racemic Alanine can be prepared by each of the following methods: (a) The Hell-Volhard-Zelinsky reaction (b) The amidomalonate synthesis (c) The Strecker synthesis [3] [COIV]

Q3c). Glucagon is a peptide hormone produced by the pancreas that, with insulin, regulates blood glucose levels. Glucagon is comprised of 29 amino acid residues. Treatment with trypsin yields four fragments, while treatment with chymotrypsin yields six fragments. Identify the sequence of amino acid residues for glucagon and determine whether any disulfide bridges are present. [3] [COIV]

Trypsin fragments a) His-Ser-Gln-Gly-Thr-Phe-Thr-Ser-Asp-Tyr-Ser-Lys b) Ala-Gln-Asp-Phe-Val-Gln-Trp-Leu-Met-Asn-Thr c) Tyr-Leu-Asp-Ser-Arg d) Arg
Chymotrypsin fragments a) His-Ser-Gln-Gly-Thr-Phe b) Thr-Ser-Asp-Tyr c) Leu-Met-Asn-Thr d) Ser-Lys-Tyr e) Leu-Asp-Ser-Arg-Arg-Ala-Gln-Asp-Phe f) Val-Gln-Trp

Q4. The following compound was isolated from nerve cells: [3] [COIV]



- Describe how this compound differs in structure from fats and oils.
- Three products are obtained when this compound is hydrolyzed with aqueous sodium hydroxide. Draw the structures of all three products.
- Four products are obtained when this compound is hydrolyzed with aqueous acid. Draw the structures of all four products

Q5a) Draw a mechanism for the base-catalyzed transesterification using ethanol in the presence of sodium hydroxide using any example. [3] [COIII]

Q5b) What is polymerization? Write all mechanistic steps for free radical mechanism. [2] [COIII]

Q5c) Explain criteria for aromaticity and determine whether the following ions is aromatic or not. [2] [COIII]

Q5d). How dienes is prepared explain by taking any one example. Write all possible products when butadiene reacts with hydrogen halide (HX). [2] [COIII]