P. P. SAVANI UNIVERSITY

Third Semester of B.Sc. Examination

December-2021

SSCH2090–Functional Group in Organic Chemistry

10.12.2021, Friday **Time: 09:00 a.m. to 11:30 a.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

Section-I (Total Marks - 30)

Q.1 Short Questions **[10]**

1.1 Objectives **[05]**

1.1a The carbonyl oxygen is _____.

A weakly acid
B weakly basic
C strongly acid
D strongly basic

1.1b Addition of water to an aldehyde or ketone, ____ - hydridized carbonyl becomes, ___ - hybridized in the addition reaction.

A SP^2, SP^3
B SP^3, SP^2
C SP, SP^3
D SP^3, SP

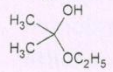
1.1c An imine is a compound with a _____ double bond

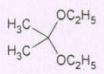
A C=C
B C=O
C C=N
D C=S

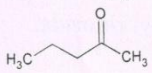
1.1d Appearance of silver mirror in Tollen's test indicates the presence of

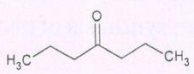
A Alcohol
B Aldehyde
C Alkene
D alkane

1.1e Acetone is treated with excess of ethanol in the presence of HCl. The product obtained is

(a) 

(b) 

(c) 

(d) 

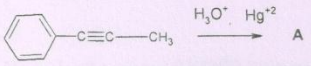
A (a)
B (b)
C (c)
D (d)

1.1f Clemmensen reduction of ketone is carried out in the presence of which of the

following:-

A H_2 and Pt as catalyst
B Glycol with KOH
C Zn – Hg with HCl
D Li Al H_4

1.1g Identify the product in reaction:



A $C_6 H_5 CH_2 CH_2 CHO$
B $C_6 H_5 CO CH_2 CH_3$
C $C_6 H_5 CH_2 COCH_3$
D $C6 H_5 CO CO CH_3$

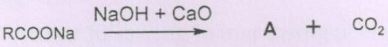
1.1h Which one of the followings is a monocarboxylic acid?

A Oxalic acid
B Succinic acid
C Formic acid
D Citric acid

1.1i What is the IUPAC name of $HOOC (CHOH)_2 COOH$?

A 2-Hydroxypropionic acid
B 2, 3-Dihydroxybutanedioic acid
C 2-Hydroxybutanedioic acid
D Butanedioic acid

1.1j The major product (A) of the reaction is an:



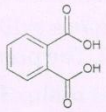
A Alcohol
B Amine
C Alkane
D Ester

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) **[05]**

1.2a Give an example of Schiff's base.

1.2b Define: Carbinolamine

1.2c Give the name of following compound:



1.2d Give reaction between Aldehyde or Ketone with 2^0 amine.

1.2e Give an synthesis of benzoyl chloride.

Q.2 Short Notes (Attempt any two) **[06]**

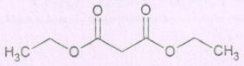
A Explain how sugar becomes cyclic hemiacetal?
B Write a short notes on Saponification with mechanism.
C Explain mechanism of claisen condensation reaction:

Q.3 Explain in detail (Attempt any two) [14]

A Give detail note on Aldol and cross aldol condensation.

B Write a short note on Michael addition.

C Explain synthesis of following compound with mechanism:

Diethyl malonate: 

Section-II (Total Marks - 30)

Q.1 Short Questions [10]

1.1 Objectives [05]

1.1a Which one is the correct relative order of dehydration of alcohols.

A $1° > 2° > 3°$

B $2° > 3° > 1°$

C $2° > 1° > 3°$

D $3° > 2° > 1°$

1.1b Glucose on reduction in presence of sodium borohydrate gives

A Sorbitol

B Fructose

C Hexanol

D No reaction take place

1.1c Which of the following can work as dehydrating agent for alcohol?

A H_2SO_4

B Al_2O_3

C H_3PO_4

D All of the above

1.1d When diethyl ether is treated with hot HI, it form

A Ethyl iodide

B Acetyl iodide

C Propyl iodide

D Ethyl alcohol

1.1e Ethylene oxide react with water, it gives

A Ethanol

B Ether

C Ethylene glycol

D ethylene

1.1f Ethylene react with bromine water and sodium hydroxide gives

A Dibromoethane

B Ethylene oxide

C monobromoethylene

D Ethane

1.1g In phenol the –OH group consists of an O-atom to a _____ hybridized aromatic C-atom.

A sp^2

B sp

C sp^3

D sp^3d

1.1h Gattermann reaction is used to introduce which functional group at *o*-position in phenol.

A –CHO
B –COOR
C –COCl
D $-COCH_3$

1.1i Vanillin is obtained by using

A Gattermann Reaction
B Hoffmann bromide Reaction
C Houben-Hosches Reaction
D Reimer-Teiman Reaction

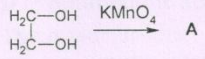
1.1j Glycerin is which type of alcohol.

A Monohydric alcohol
B Trihydric alcohol
C Dihydric alcohol
D Tatrahydric alcol

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) **[05]**

1.2a Give the structure of 2,3-dimethylcyclooctanol.

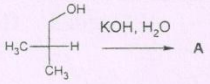
1.2b What is **A** in the following reaction?



1.2c Arrange following in increasing acidic strength:
o-nitrophenol, p-nitrophenol, phenol, m-nitrophenol.

1.2d Why phenols are more acidic than alcohol?

1.2e Write the product in the following reaction?



Q.2 Short Notes (Attempt any two) **[06]**

A Give detail classification of alcohols.
B Do the conversion: Aniline to Chlorobenzene
C Give some important chemical reactions of epoxide.

Q.3 Explain in detail (Attempt any two) **[14]**

A Explain intramolecular and intermolecular dehydration of alcohol with mechanism.
B How –OH group of phenol react chemically? Explain with reactions.
C Give detail account on Williamson synthesis of ether.