Total No. of Printed Pages:3

SUBJECT CODE NO:- R-6079
FACULTY OF SCIENCE & TECHNOLOGY
M.Sc. (Sem-III) Examination Oct/Nov 2018
Chemistry
Asymmetric Synthesis & Bio- Organic Chemistry -CHEO-315

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Question number one 1 compulsory.
ii) Attempt any five question from Q.2 to Q.8
iii) Figures to the right indicate full marks.

Q.1 A) Choose the correct option for the following. 10

i) Lysozyme catalysis the hydrolysis of
a) Peptide linkage b) Polysaccharide
c) –C(=O)–NH– linkage d) anhydride

ii) NAD^+ use for
a) Oxidation b) Reduction
c) Hydrolysis d) Trans esterification

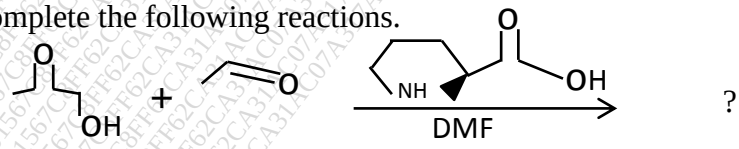
iii) Biotin and Haemoglobin used for
a) O_2 *and* N_2 carrier respectively b) O_2 *and* CO_2 carrier respectively
c) CO_2 *and* O_2 carrier respectively d) CO_2 *and* N_2 carrier respectively

iv) Which is the sulphar containing amino acid
a) Glycine b) Proline c) Cystine d) Lysine

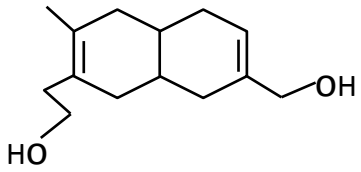
v) What is mean by reaction going in 94% enantiomeric excess?

a) Product contain 94% of one enantiomer and 6% of other enantiomer
b) Product contain 94% of one enantiomer and 6% of other products
c) The product contain one enantiomer as 94% pure
d) The product contain 97% of one enantiomer and 3% of other enantiomer

B) Complete the following reactions. 10

i) 

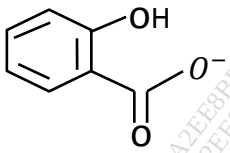
?

ii) 

$\xrightarrow[\text{(-)DET}]{\text{tBuooH ,Ti } (O_iP_r)_4}$?

iii) $R_1 - \overset{\overset{O}{\|}}{C} - NH - \overset{\overset{R_2}{|}}{CH} - \underset{\underset{O}{\|}}{C} - O^-$ H_2O $\xrightarrow{\text{Carboxypeptidase}}$?

iv) $CH_3 - \overset{\overset{O}{\|}}{C} - \overset{\overset{O}{\|}}{C} - O^-$ $\xrightarrow{\text{Pyruvate decarboxylase}}$?

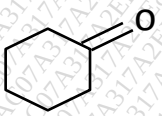
v) 

$\xrightarrow[FADH_2,\ O_2]{\text{Salicylate Hydro oxygenase}}$?

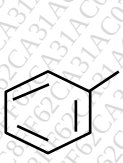
Q.2 i) Explain lineweaver Burk plot 04
ii) Give an account of TPP 04
iii) Write note on cyclodextrin 04

Q.3 Write note on 12
i) Ionophores
ii) quaternary structure of enzyme
iii) Asymmetric dihydroxylation

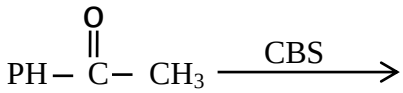
Q.4 Predict the product with suitable Mechanism 12

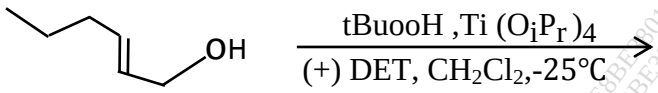
i) 

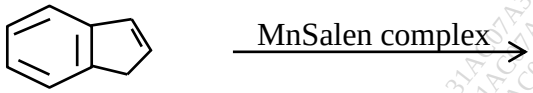
$\xrightarrow{FADH_2,\ O_2}$

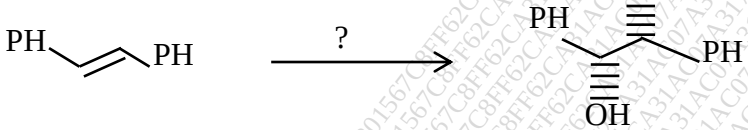
ii) 

$\xrightarrow{\beta\text{ –Cyclodextrin}}$

iii) 

iv) 

v) 

vi) 

Q.5 Depict the structure and explain the function of 12

i) NAD
ii) Jacobsen asymmetric epoxidation model.
iii) BINAP

Q.6 i) Explain the structure of Haemoglobin 04
ii) Explain the Induced fit theory of enzyme action. 04
iii) Give the conversion of proline to CBS reagent. 04

Q.7 i) Explain Gel filtration technique of enzyme purification. 04
ii) What is the effect of pH and temperature on enzyme activity? 04
iii) Explain enzyme Inhibition and its types. 04

Q.8 Write note on 12

i) Lysozyme
ii) Callixrane
iii) Mechanism of enzyme action.

Total No. of Printed Pages:2

SUBJECT CODE NO:- R-6080
FACULTY OF SCIENCE & TECHNOLOGY
M.Sc. (Sem-III) Examination Oct/Nov 2018
Chemistry
Environmental Analysis & Monitoring - CHEA- 315

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 is compulsory.
ii) solve any five questions from section B
iii) Use single answer book for section A & B
iv) Non-programming calculator is allowed

SECTION-A

Q.1 A) Match the terms in A with those in B 05

A		B	
i.	NO_x sources	a.	Toxic element
ii.	Acid Rain	b.	Carcinogenic
iii.	Arsenic	c.	Fuel burn out
iv.	Hydrocarbons	d.	Mixture of H_2SO_4 & HNO_3
v.	Lead poisoning	e.	Hematological damages
		f.	Vehicle pollution

B) Fill in the blanks with appropriate words. 05
i) Sugar industries are operated only for ---------- days
ii) Nitrogen in soil is determined by ---------- method
iii) Dissolve oxygen can be determined by --------- method
iv) Minamata disease occurs due to ---------- poisoning
v) Lead is the ---------- metal.

C) Answer in one sentence 05
i. Name the solvent termed as green solvent
ii. Give the composition of soil.
iii. Enlist the toxic elements.
iv. Write the structure of DDT
v. What are carcinogens?

D) Select most appropriate answer in the following. 05
i. Tooth decay is due to
a. Ca b. Mg c. Pb d. F

ii. The term atom economy is related with
a. Green chemistry b. Reaction mechanism
c. Catalytic synthesis d. All of these

iii. Which of the following pollutant is responsible for acid rain.

a. Benzene
b. Polyacramides
c. SO_2
d. Dust particles

iv. which of the following is mostly used as supercritical fluid

a. NO_2
b. Air
c. O_2
d. CO_2

v. Which of the following is cancer causing agent.

a. Polyarenes
b. Phenol
c. Resin
d. Surfactants

SECTION-B

Q.2 a. Define hardness of water. How will you determine the total hardness? 06

b. Define sampling of soil? Explain the sampling of soil. 06

Q.3 a. Give the experimental procedure to carry out the analysis of cadmium from water sample. 06

b. Give the devices and their working which help in reducing particle emissions. 06

Q.4 a. Write a note on Biochemical effect of Mercury 06

b. Give the sources & sink forNO_x . How will you control its pollution level. 06

Q.5 a. How the hydrocarbons are harmful to human beings as well as plants? 06

b. Write a note on pollution due to pharmaceutical industrial. 06

Q.6 a. Describe the sampling of water and its preservation method. 06

b. Describe the principle and concept of green chemistry. 06

Q.7 a. Define chemical Oxygen Demand. Write the experimental procedure for COD in water sample. 06

b. What is acid rain? Express its formation process. 06

Q.8 a. Describe the inorganic and organic components of soil. 06

b. How PAN is formed in smog producing chain? 06

R-6063

Total No. of Printed Pages:3

SUBJECT CODE NO:- R-6063
FACULTY OF SCIENCE & TECHNOLOGY
M.Sc. (Sem-I) Examination Oct/Nov 2018
Chemistry
Organic Chemistry - CHE 103

[Time: Three Hours] **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B i) Q. No. 1 is compulsory.
ii) Attempt any five questions from Q. 2 to Q. 8
iii) Figures to right indicate full marks.

A. Select the correct option for the following (one marks for each question) 10

1. The number of chiral carbon in tartaric acid is
   a. One b. two c. three d. four

2. Enantiomers are _____ of each other
   a. Super-impossible mirror images
   b. Not mirror images
   c. Non-super impossible mirror images
   d. None of these

3. From the following which compound is non-aromatic
   a. [10] annulene b. [18] annulene c. Naphthalene d. Anthracene

4. The hybridization of carbon is SP^2 in
   a. Carbocation b. Fullerene c. Benzene d. All of these

5. From the following which reagent act as nucleophile.
   a. H_2O b. NH_3 c. R-SH d. All of these

6. SET mechanism stand for
   a. Single Electron Transfer b. Substitution Electron Transfer
   c. Single Electrophile Transfer d. None of these

7. Stereochemistry of SN^i reaction is
   a. Racemization b. Inversion c. Retension d. All of these

8. In Hammette equation positive value of substituent constant means the substituent is
   a. Electron donating b. electron withdrawing c. Both a & b d. None of these

9. Huckel rule of antiaromaticity is
   a. $4n\,\pi\,e^{\ominus}$ b. $4n+2\,\pi e^{\ominus}$ c. $4n+4\,\pi\,e^{\ominus}$ d. $4n-2\,\pi\,e^{\ominus}$

10. Most stable conformation of cyclohexane is
    a. Boat b. Twist boat c. Half chair d. Chair

B. Answer the following questions 10
[Two marks for each question]

1. Draw resonance structure of p-nitro aniline. Indicate important contributor to resonance hybrid.
2. Explain in brief Diasleromers.
3. Why boiling point of p-nitro phenol is higher than o-nitro phenol?
4. What is mean by Erythro and threo isomer, explain with suitable example.
5. Explain in brief Ambident nucleophile.

Q.2 Solve the following questions. 12
a. Explain with suitable example, how isotopic labeling helps to predict the mechanism?
b. Draw the π molecular orbitals of 1,3 butadiene and 1,3,5 hexatriene with increasing order of their energy. Provide HOMO and LUMO labels to orbital.

Q.3 Solve the following questions. 12
a. Draw various conformation of 1,2 dimethyl cyclohexane. Comment on their optical activity and stability.
b. Explain the effect of substrate structure on aliphatic nucleophilic substitution reaction.

Q.4 Solve the following questions. 12
a. Explain various methods for resolution of enantiomers.
b. Give methods of generation and reaction of carbonium ion.

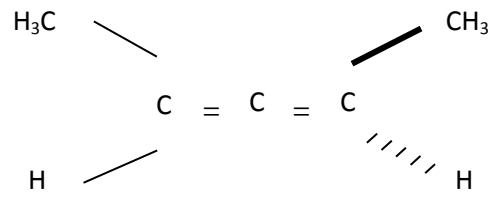
Q.5 Write short note on following 12
a. SN^i reaction
b. Catenanes and rotaxnes
c. Phase transfer catalyst

Q.6 Write short note on following. 12
a. Kinetic and thermodynamic control
b. HSAB

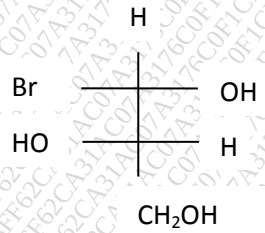
Q.7 Write short note on following 12
a. Bonding in fullerene
b. Curtin-Hammette principle
c. Taft's equation

Q.8 a. Assign R/S configuration for the following 06

i.



ii.



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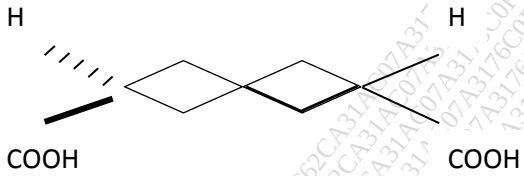
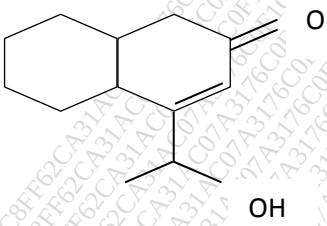
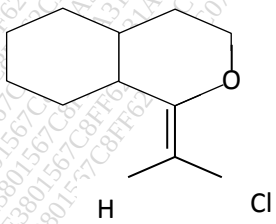


b. Assign E/Z nomenclature to the following 06

i.



ii.



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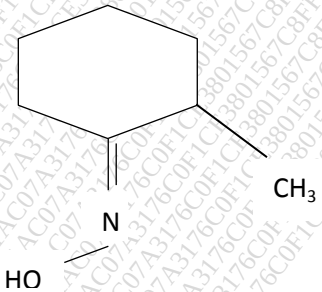


Total No. of Printed Pages:02

SUBJECT CODE NO:- R-6032
FACULTY OF SCIENCE & TECHNOLOGY
M.Sc (Sem-I) Examination Oct/Nov 2018
Chemistry
Inorganic Chemistry - CHE 102

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
i. All questions are compulsory in section – A.
ii. Attempt any five questions from section – B.
iii. Write section A and B in same answer book.

Section A

Q.1 Answer the following 20

a) Define identity.
b) Write biological role of gold.
c) List the symmetry elements of
   i) $C_2H_2Cl_2$
   ii) $[FeF_6]^{3-}$
d) What is acid hydrolysis?
e) Define stability constant.
f) What is standard reduction formula?
g) Diagrammatically show water molecule has plane of symmetry.
h) Give two examples showing Cnh point group.
i) Write two names of metallo enzymes.
j) What is cooperativity effect?

Section B

Q.2 Answer the following 12

a) Define the following terms.
   i) Group ii) Subgroup iii) Order iv) matrix

b) Discuss great orthogonality theorem (without proof) and its significance.
c) What are uses of character table?

Q.3 Answer the following 12

a) What do you mean by base hydrolysis? Discuss conjugate base mechanism with suitable example.
b) What is effect of steric hindrance on acid hydrolysis? Explain with example.
c) Discuss bimolecular nucleophilic substitution mechanism.

Q.4 Answer the following 12

a) Discuss chelate effect.
b) Explain the determination of formation constant for binary complexes using pH metric technique.

c) Derive the mathematical expression of the relationship between stepwise and overall stability constant.

Q.5 Answer the following 12

a) Explain the meaning of the following symbols with respect to molecular symmetry.
i) C_2V ii) σ_h iii) S_n iv) i v) E

b) What is group multiplication table? Construct a group multiplication table for C_3V point group by taking NH_3 as an example.

c) Give the point group of the following.
i) Benzene ii) HCl iii) Co iv) Co_2

Q.6 Answer the following 12

a) What are metalloporphyrins? Explain its role.
b) Write note on 'Metal deficiency disease'.
c) Explain the biological role of cobalt compounds.

Q.7 Answer the following 12

a) Explain metallodrug with reference to cis-plation & carboplation.
b) Discuss the outer sphere electron transfer reaction in octahedral complexes.
c) Explain the classification of inorganic reactions in octahedral complexes

Total No. of Printed Pages:05

SUBJECT CODE NO:- R-6047
FACULTY OF SCIENCE & TECHNOLOGY
M.Sc (Sem-III) Examination Oct/Nov 2018
Chemistry
Organic Synthesis - CHEO-314

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

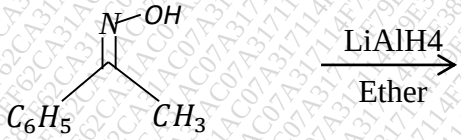
N.B
i) Question No. 1 is compulsory
ii) Attempt any five questions from Q.No.2 to Q.No.8
iii) Figure to the right indicate full marks

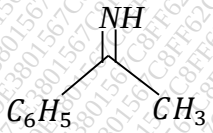
Q.1 A) Choose the correct option for the following 10

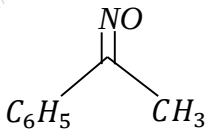
i) In swern oxidation of primary alcohols oxidizing agent used.
a) Dmso & oxalyl chloride b) Dmso
c) Dmso & H_2O_2 d) Dmso & HC1

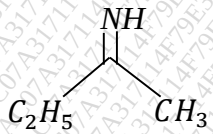
ii) Chemical formula for PDC is
a) $[(C_6H_5NH_2)_2\ (Cr_20_7)]$ b) $[(C_5H_5NH)_2\ (Cr_20_7)]$
c) $[(C_5H_5NH)_2\ (Cr0_3)]$ d) $[(C_5H_5NH)\ (Cr_20_7)]$

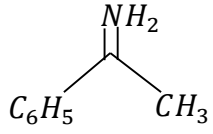
iii) The product 'A' in the following reaction is



a) 

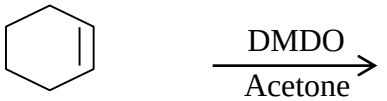
b) 

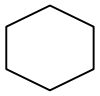
c) 

d) 

iv) EDC is used as
a) Oxidizing agent b) Coupling agent
c) Reducing agent d) Alkylating agent

v) The product 'B' in following reaction is



a) 

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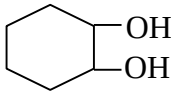
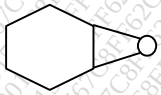
b) 

d) 

vi) Stereo selective reduction of ketones is generally carried by

a) $LiAlH_4$ b) $NaBH_4$ c) H_2/Pt d) $k^+HB^-(-\underset{\displaystyle CH_3}{\underset{|}{C}}HCH_2CH_3)_3$

vii) Stork enamine reaction is

a) Enationselective b) Diastereoselective
c) Regioselective d) Nonselective

viii) Grignard reagent contains which metal?

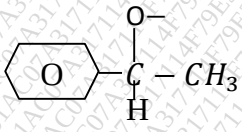
a) Al b) Mg c) Cu d) Zn

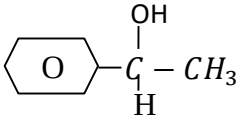
ix) Which of the following is sulfonium ylide

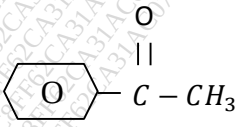
a) $(CH_3)_2\overset{\displaystyle O}{\overset{||}{S}}_+ - \underline{C}H_2$ b) 

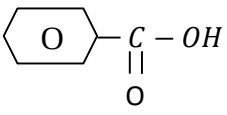
c) $CH_3 - \overset{\displaystyle O}{\overset{||}{S}} - CH_3$ d) $(CH_3)_2\overset{+}{S}\text{-}\overset{-}{C}H_2$

x) The product 'B' in the following reaction is

a) 

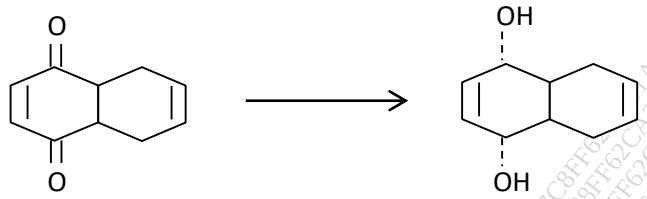
b) 

b) 

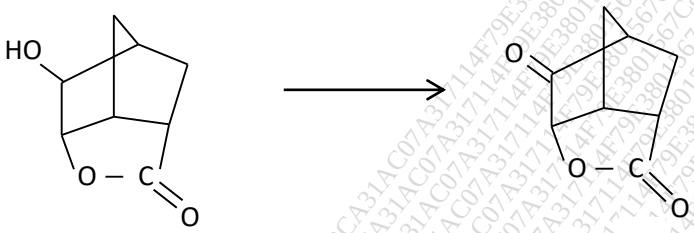
d) 

B) Suggest reagent(s) with conditions for the following conversions 10

i)

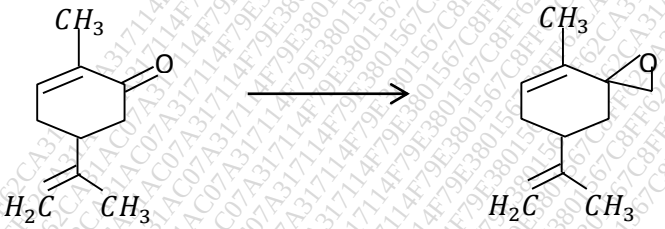


ii)



iii)

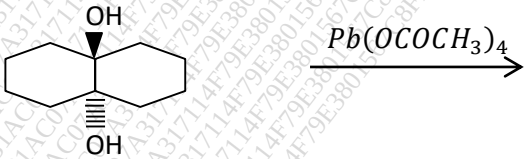
iv)



v)

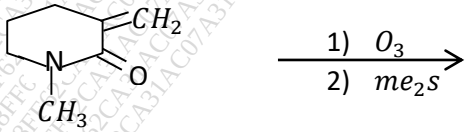
Q.2 Complete the following reactions 12

i)

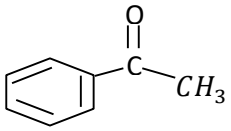


?

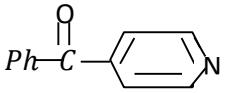
ii)

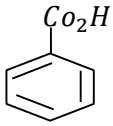


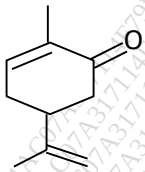
?

iii)  $\xrightarrow{Seo_2}$?

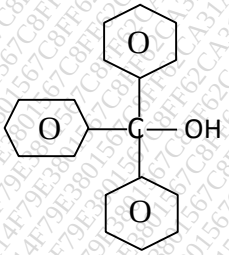
Q.3 Complete the following reactions with mechanism 12

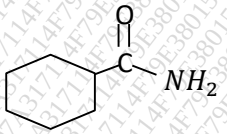
i)  $\xrightarrow[HCl]{Zn/Hg}$?

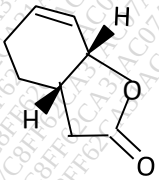
ii)  $\xrightarrow[Liq.NH_3]{Na}$?

iii)  $\xrightarrow[Benzene]{H_2,[(C_6H_5)_3P)]_3\ Rhcl}$?

Q.4 Predict the product with mechanism 12

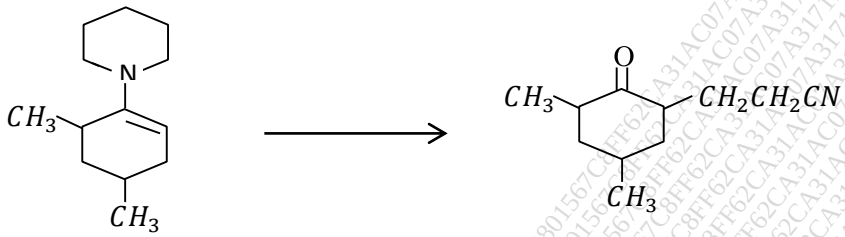
i)  $\xrightarrow[THF-HMPA]{H_2,SmI_2}$?

ii)  $\xrightarrow[reagent]{Lawesson's}$?

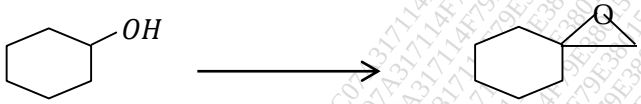
iii)  $\xrightarrow[2)\ CH_3I]{1)\ LDA}$?

Q.5 Provide an appropriate synthetic route for the following transformations 12

i)



ii)



iii)

Q.6 Explain following reactions with mechanism 12

i) Robinson annulation
ii) Wolf Kushner reduction
iii) Moffatt oxidation

Q.7 Write a note on following (any three) 12

a) Organo lithium
b) Organo chromium
c) Organo silicon
d) Organo Boron

Q.8 Give the synthetic applications of the following 12

a) Dess martin periodinone
b) TBTH
c) DDQ

Total No. of Printed Pages:03

SUBJECT CODE NO:- R-6048
FACULTY OF SCIENCE & TECHNOLOGY
M.Sc. (Sem-III) Examination Oct/Nov 2018
Chemistry
Electro Analytical Techniques-CHEA-314

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Question No. 1 is compulsory from section A.
ii) Attempt any 5 questions from selection B.
iii) No-programmable calculator is permitted.

Section A

Q.1 A) Match the terms in A with those in B 05

A		B
i)	Ilkovi equation	a) H-Shapped
ii)	S.H.E	b) Daniel Cell
iii)	Weston cell	c) Flow of ions
iv)	Galvanic cell	d) H_2 gas
v)	Electrophoresis	e) $id = 607n\ CD^{1/2} \times m^{2/3}\ t^{1/6}$
		f) Potentiometry

B) Fill in the blanks 05

i) The difference between residual current and limiting current is _____

ii) The calomel electrode is represented as _____

iii) The standard electrode potential of silver-silver chloride electrode at $25^{\circ}\ C$ is _____

iv) Cathode control potential Gravimetry is also known as _____ method

v) A _____ is an instrument that maintains the working Potential at a constant value

C) Choose anyone correct option 05

i) The conversion of electrical energy to chemical energy is brought about by_____
a) Lead storage battery b) Galvanic cell
c) Electrolytic cell d) Cathodic cell

ii) The technique in which the is completely oxidized or reduced to a simple product of known concentration is known as_____
a) electrogravimetry b) coulorimetry
c) polarography d) polarimetry

iii) The electrode potential of glass electrode is

a) $E_G = E_G^\circ + 0.059\ P^H$ b) $E_G^\circ = E_G - 0.059\ P^H$

c) $E_G = E_G^\circ - 0.059\ P^H$ d) $E_G^\circ = E_G - 6.953\ P^H$

iv) The Weston cell can be represented as

a) $Hg/Hg^{2+}\ (sat)/\ Hg_2S0_4$

b) $Ag/Ag^{3+}\ (sat)/\ KCl$

c)) $Ag/AgCl\ /\ H_2(1\ atm)Pt$

d) $Cd/Cd^{2+}\ (sat)/\ Hg_2S0_4\ /\ Hg$

v) The observation of glass electrode was first found by

a) Schrodinger b) Ohm and Faraday

c) Haber and Klemensiwing d) Koing

D) Answer in one sentence 05

i) What is molecular polarization ?

ii) Draw C-V curve

iii) Explain polarogram

iv) What is diffusion current?

v) Write basic principle of electrophoresis

Section B

Q.2 Answer the following 12

i) What is dropping mercury electrode? What are its advantages and disadvantages?

ii) Discuss the polarography. Give some of its important application

Q.3 Answer the following 12

i) What is over voltage? What is its significance?

ii) Discuss the advantages of potentiometric titration over ordinary indicator method

Q.4 Answer the following 12

i) What are ion selection electrodes? Explain in detailed solid state electrode

ii) Write a brief note on paper electrophoresis. Explain its advantages and disadvantages

Q.5 Answer the following 12

i) What are high frequency titration methods? Discuss some of the important application of two methods

ii) Discuss briefly the various coulometric techniques

Q.6 Answer the following 12

i) Write explanatory note on anodic and cathodic stripping coulometry

ii) What is the principle of electro gravimetry ? Explain the instrumentation with schematic diagram.

Q.7 Answer the following 12

i) What will be the concentration of Pb(II) in solution. Calculate using the following polarographic data
($id = 10.4\ \mu A. m = 7.44\ mg\ Sec^{-1}, t = 8\ Sec\ and = 1.48 \times 10^{-5}\ cm^2\ Sec^{-1}$)

ii) Write a note on
a) Oxidation potential
b) Reduction potential

Q.8 Answer the following 12

i) Describe the working of S.H.E with schematic diagram. Explain its disadvantages

ii) What do you mean by the term concentration gradient

Total No. of Printed Pages:04

SUBJECT CODE NO:- R-6017
FACULTY OF SCIENCE & TECHNOLOGY
M.Sc. (Sem-III) Examination Oct/Nov 2018
Chemistry
Structural Elucidation by Spectral Methods CHE-313

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
i. Question No.1 is compulsory.
ii. Attempt any five questions from Q.2 to Q.8.
iii. Figure to right indicate full marks.

Q.1 A) Choose the correct alternative for the following. 15

1) How many different types of protons are present in $CH_3CH_2CONH_2$
a) 3 b) 2 c) 7 d) 4

2) No of ^{13}C NMR signals in ethanol.
a) One b) two c) three d) four

3) Which of the following not observed in Mossbauer spectroscopy.
a) Isomer shift b) Quadrupole splitting
c) Fermi resonance d) Nuclear Zeeman splitting

4) Hyper fine lines in CH_3 radical
a) One b) two c) three d) four

5) No of signals in $^1_1H\ NMR$ spectra of $(CH_3)_3C-CH_2-CHO$
a) Two b) Three c) Four d) Six

6) Which is used as a solvent in $^1_1H\ NMR$
a) C_2H_5-OH b) TMS c) $CDCl_3$ d) $CHCl_3$

7) Energy source of Mossbauer. Spectrometer.
a) γ – rays b) β - emission
c) Cosmic rays d) None of these

8) The basic principle of ESR is analogous to
a) NMR b) Mass spectroscopy
c) Mossbauer d) IR spectroscopy

9) Retro Diel's alder process observed in
a) NMR b) UV
c) Mossbauer d) Mass spectroscopy

10) No of ^{13}C NMR peaks in $CH_3 - \overset{O}{\overset{\|}{C}} - CH_2Cl$.

a) One b) two c) three d) zero

11) No of Mossbauer signals in $K_3[Fe\ (CN)_6]$

a) One b) two c) three d) Zero

12) m/e at 156 and 158 CM^+ & m2 peaks observed in 1:1 ratio for the compound

a) C_2H_5Cl b) C_2H_5Br

c) C_2H_5I d) $C_2H_4Cl_2$

13) The signal of $CH_3 - \overset{O}{\overset{\|}{C}} - CF_3$ in $^1_1H\ NMR$ is

a) Singlet b) Doublet c) Triplet d) Quartet

14) Region of electromagnetic radiation used in ESR

a) Microwave b) IR region

c) UV region d) X – ray region

15) Which of the following compounds with give peak at m/e 91.

a) $C_6H_5CH_2Cl$ b) C_6H_5Cl

c) C_6H_5OH d) All of these

B) Match the following 05

Column A	Column B
Mossbauer	Molecular ion peak
^{13}C NMR	Paramagnetic compound
Mass spectra	Quadrupole splitting
ESR	Coupling constant
J – value	Proton noise decoupling

Q.2 Write a note on 12

a) Factors affecting coupling constant

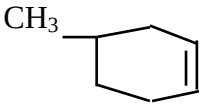
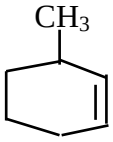
b) Applications of ESR

c) Isomer effect in Mossbauer spectroscopy

Q.3 Solve the following 12

a) Distinguish the following pairs

i) $C_2H_5 - \overset{O}{\overset{\|}{C}} - OCH_3$ & $CH_3 - \overset{O}{\overset{\|}{C}} - OC_2H_5$ by $^1_1H\ NMR$

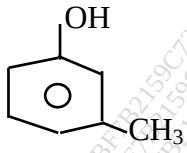
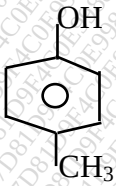
ii)  &  by mass spectra

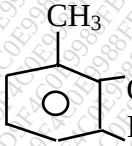
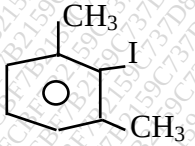
b) Deduce the structure & assigned peaks.
MF C_4H_7N
IR 2971 , 2273 1460 cm^{-1}
$^1_1H\ NMR$ 7.28 δ $(1H\ sept)$
8.69 δ $(6\ H\ d)$

c) Deduce the structure and assign the peaks
MF C_3H_6O
UV 200 nm
IR 2941 , 2857 , 1458 cm^{-1}
$^1_1H\ NMR$ 2.75 (m , 2H)
4.75 (t , 4H)

Q.4 Answer the following 12

a) Distinguish the following pairs.

i)  &  by $^1_1H\ NMR$

ii)  & 

b) Deduce the structure & assign signals / peaks.
MF $C_4H_5NO_2$
IR 1700 cm^{-1}
^{13}C NMR 30.3 (t,2c)
180.4 (s ,2c)

c) Deduce the structure and assign signals peaks.
MF $C_5H_8O_2$
IR 1818 cm^{-1}
$^1_1 HNMR$ 2.2 δ $(s, 6H)$
2.4 δ $(s, 2H)$

Q.5 Solve the following 12

a) Explain the fragmentation of l – hexanol .
b) Distinguish three isomeric Dutanols by mass spectroscopy.
c) Write a note on FAB technique.

Q.6 Answer the following 12

a) Explain the quadrupole splitting and number of signals in FeF_3 and FeF_2.
b) Which source of gamma radiation is used in Mossbauer spectroscopy and why?
c) Explain different energy levels and resultant quadrupole splitting of system of $Ig = {}^{3}/_{2}$, $Ie = {}^{5}/_{2}$ having an axially symmetrical electrical field gradient tensor.

Q.7 Solve the following 12

a) Explain the ESR spectrum of triphenyl methyl radical.
b) Calculate the E.SR frequency of an unpaired electron in magnetic field. 0.33T given $g = 2 \quad \beta = 9.273 \times 10^{-24} JT^{-1}$
c) Discuss the basic principle of E.S.R.

Q.8 Deduce the structure and assign peaks. 12

a) MF $C_7H_{14}O_2$
IR $1718\ cm^{-1}$
Mass m/e 130, 115, 43
$^{1}_{1}HNMR$ 1.3 $\delta\ (s, 6H)$
2.2 $\delta\ (s, 3H)$
2.6 $\delta\ (s, 2H)$
3.2 $\delta\ (s, 3H)$

^{13}C NMR 25 ppm (q strong)
38 ppm (q)
50 ppm (q)
54 ppm (t)
75 ppm (s)
208 ppm (s)

b) MF $C_6H_{12}O_2$
UV 210 nm
IR in cm^{-1} 2924 (m) , 1756 (m) 1745 (s)
$^{1}_{1}HNMR$ two singlet at 1:3 ratio
1.47 $\delta\ (s, 9H)$
1.97 $\delta\ (s, 3H)$