

UNIVERSITY OF BALOCHISTAN QUETTA
MA / MSc (ANNUAL) EXAMINATION 2014.

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SUBJECT: **CHEMISTRY** **PAPER-III (Final)**
(BIOCHEMISTRY)

Time Allowed: 3 Hours

Max. Marks: 100

Note: Attempt any five questions in all but Question No. 1 in Section – I is compulsory and time for Section – I is only 40 Minutes. After expiry of the time paper should be handed over to the supervisory staff.

Section – I (objective portion, 20 Marks) Time Allowed: 40 Minutes

Q.No. 1. Attempt any 10 short questions. All questions carry equal marks.

- i. What is the range of UV-Vis region in the spectrum?
- ii. What is difference between absorption and emission spectroscopy?
- iii. What is flame photometry?
- iv. What is difference between single and double beam spectrophotometer?
- v. Which type of compounds can be separated by using ion-exchange chromatography?
- vi. Which type of elements can be determined by using flame photometer?
- vii. Define isoelectric focusing.
- viii. Draw the block diagram of spectrophotometer.
- ix. What are the major forms of RNA?
- x. What type of information is present in DNA?
- xi. Define replication and transcription.
- xii. What are the eukaryotic chromosomes?
- xiii. What is ultracentrifugation?
- xiv. Are genes composed of DNA or protein?
- xv. What are DNA tumor viruses?

SECTION – II (Subjective Portion, 80 Marks)

TIME ALLOWED: 2:20

Note: Attempt any four questions. All questions carry equal marks

- Q.NO.2.** Describe the principles and instrumentation of flame of photometry?
- Q.No.3.** What is ultraviolet-visible spectroscopy and discuss the applications of spectrophotometer?
- Q.No.4.** What is the chromatography, discuss the gel filtration and affinity chromatography?
- Q.No. 5.** Explain briefly the structure, replication and genetics of DNA and RNA tumor viruses.
- Q.No.6.** What is Beers-Lambert law and describe in detail the instrumentation of spectrophotometer?
- Q.No.7.** Discuss in detail nucleic acid structure and DNA as genetic material.
- Q.No.8.** Write note on any two the following:
- | | |
|--------------------------------|---|
| a) Genetic code | b) Gel electrophoresis |
| c) Ion-exchange chromatography | d) Interaction of radiation with matter |

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Subject: CHEMISTRY PAPER-I (FINAL)
ANALYTICAL CHEMISTRY

Time allowed: 3 hrs.

Maximum marks: 100

NOTE: Attempt any five Questions. Question No. 1 is compulsory. Time for Question No. 1 is only 40 min. After this time, the Answer book should be handed over to supervisory staff. All Questions carry equal marks.

SECTION-I (20 Marks)

Question No. 1: Distinguish between:

- i. diffusion and migration
- ii. a coulomb and an ampere
- iii. a working electrode and a reference electrode
- iv. limiting current and a diffusion current
- v. linear-scan voltammetry and pulse voltammetry
- vi. voltammetry and amperometry
- vii. an enzyme and a substrate
- viii. an antigen and an antibody
- ix. sensitivity and selectivity
- x. an inhibitor and an activator

SECTION-II (80 Marks)

Note: Attempt any four questions from this section. All questions carry equal marks

- Question No. 2:**
- a) Define polarography.
 - b) What are the advantages of DME over a solid micro-electrode? Discuss the inorganic applications of DME.
- Question No. 3:**
- a) Draw a labeled sketch of glass membrane electrode. Explain its importance in potentiometric techniques.
 - b) Describe various types of potentials associated with glass electrode.
- Question No. 4:**
- a) What are co-enzymes? Describe the kinetics of enzymatic reactions?
 - b) Write down the analytical applications of immobilized enzymes.
- Question No. 5:** What is radio chemical analysis? Explain in detail neutron activation analysis and isotopic dilution analysis.
- Question No. 6:**
- a) What is hemolysis and why is it important?
 - b) Explain the principles of immunoassays.
- Question No. 7:**
- a) Describe the function of trace elements in the body?
 - b) What is amperometry? Describe amperometric titration curves with analytical applications.
- Question No. 8:**
- a) What are the alkaline error and the acid error of a glass membrane pH electrode?
 - b) Describe the different types of ion-selective electrodes..
- Question No. 9:**
- a) What is a supporting electrolyte and what is its role in electrochemistry?
 - b) How do electrogravimetric and conductometric methods differ from potentiometric methods? Consider currents, voltages, and instrumentation in your answer.

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Subject:- **CHEMISTRY** Paper:- I(Final)
Inorganic Chemistry

Time Allowed :- 3 Hours

Max : Marks : 100

Note :- Attempt any Five Questions in All But Question No. 1- in section -I is compulsory and the time for Section- I is only 40 Minutes. After Expiry of the Time paper should be handed over to the supervisory staff.

SECTION -I (OBJECTIVE PORTION 20 MARKS)

Q.No.1 Write short answers of the 20 following Questions.

1. Define CFSE & pairing energy.
2. Define hybridization giving one example.
3. Give at least one failure of valence bond theory and V.S.E.P.R.T.
4. Define ligand isomerism with one example.
5. Define organometallic compound by giving one example.
6. What is noble gas formalism
7. Write down the formula of Dibenzene chromium salt
8. Write down suitable chemical equation which shows that HF is non aqueous solvent.
9. Write down two chemical reactions with SO₂
10. What are solvatic reactions.
11. What are amphoteric solvents give one example.
12. Draw the structure of Fe₂(CO)₉.
13. Write down the formula of Zeies's salt.
14. Draw the geometry of CO(EDTA)
15. Define protic solvents give two examples.
16. Define carbonyl complexes.
17. What is metalloene.
18. Define radioactive dating
19. Differentiate between fission and fusion reactions.
20. What kind of products are formed when neutron strike with U-235 mention the reaction.
21. Differentiate between α β and γ rays.
22. Define half life.
23. What is Circular dichorision.
24. Define synergic Effect.
25. What is the function of moderators in nuclear reactions.
26. Give two uses of I-131.
27. Give one Example of Seven- Electrons donar system.
28. What is the difference between coordination and organometallic compound.
29. Why He₂ cannot exist.
30. Why H₂S is a gas while H₂O is liquid.

SECTION -II (SUBJECTIVE PORTION 80 MARKS) TIME ALLOWED 2:20

Attempt any Four (04) questions.

- Q1. Write down the stereo chemical aspects of Werner coordination theory.
- (b) How Werner explained the structure of CO (NH₃)₆CL₃
- Q2. Explain V.S.E.P.R.T in detail.
- Q3. Discuss ammoniation, Ammonolysis, redox & Complex reaction in Liquid NH₃
- Q4. Describe chemistry of HF in detail.
- Q5. Define optical activity & how it can be explained in complex. Give examples.
- Q6. Discuss disintegration theory and role of disintegration.
- (B) Explain working of cyclotron
- Q7. Discuss four electiqn donar systems in details.
- Q8. (a) How can you calculate the CFSE in octahedral, Tetrahedral & square planer complexes.
- (b) Explain the following complexes with reference to C.F.T
- Co(en)^3+ , $\text{K}_4\text{Fe}(\text{CN})_6$, $[\text{Co}(\text{NH}_3)_4]^{2+}$, $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$
- Q9. Write short note on any two of the following.
- (1) Geometrical Isomerism
 - (2) Liquid SO₂.
 - (3) 5-electron donors
 - (4) Fission & fusion reactions.

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Subject:-

CHEMISTRY
Organic Chemistry

Paper I Final

Time allowed:- 3 Hours

Max. Marks: 100

Note: - Attempt any Five Questions in All But Question No. 1 in section-I is compulsory and the time for Section-I is only 40 Minutes. After Expiry of the Time paper should be handed over to the supervisory staff.

SECTION - I (20)

Q. NO.1 Attempt 20 Questions.

1. Why styrene gives head to tail radical polymerization not head to head polymerization?
2. Why isobutylene does not give the kind of stereoisomeric polymers that propylene does?
3. Give the structures of monomers from which following polymers would most likely to be formed
 - a) PVC
 - b) Teflon
 - c) Orlon
4. How the synthesis of any aromatic compound can be initiated by electrophilic substitution reaction?
5. What is arenium ion and how can we account for its stability?
6. Complete the following equations:
 - a) Ethyl benzene + $K_2Cr_2O_7$ + H_2SO_4 →
 - b) Ethyl benzene + CH_3Cl + $AlCl_3$ →
7. Why sodium iodide is used to catalyse the hydrolysis of methyl chloride?
8. Why optical activity of 2-iodooctane decreases on treating with potassium iodide in acetone?
9. $-OCH_3$ (methoxy) group is ortho, para directing even when oxygen is more electronegative than carbon. Why?
10. Why acetanilide is less reactive toward electrophilic substitution than aniline?
11. Why methyl alcohol reacts faster with hydrogen bromide as compared to other primary alcohols?
12. Why *p*-nitrophenol has high boiling point and high water solubility as compared to *o*-nitrophenol?
13. Why triphenyl amine and *p*-nitroaniline are weaker bases than aniline?
14. What is Hofmann rule give one example?
15. What is condensation polymerization give one example?
16. Why benzyne is more reactive than benzene?
17. What will be the effect of incoming nucleophile on nucleophilic substitution reaction?
18. Give a reaction in which organo-mercury compound is used.
19. What is electron deficient rearrangement give an example?
20. Why the groups having lone pairs in conjugation with aromatic ring are ortho, para-directing with activation of the ring?
21. What will be the stability order of free radicals?
22. What is the role of the Lewis acids in electrophilic substitution reactions on benzene?

SECTION -II

MARKS-80

TIME ALLOWED- 2:20 HOURS

NOTE: ATTEMPT ANY FOUR QUESTION. ALL QUESTIONS CARRY EQUAL MARKS.

- Q.No.2** Discuss the general characteristics of free radical reactions. Explain the free radical mechanism at an aromatic substrate and how neighboring groups assist in free radical reaction?
- Q.No.3** Discuss Nucleophilic Aromatic Substitution reactions along with their different mechanisms and applications.
- Q.No.4** Explain the generation and detection of free radicals. Also discuss Barton reaction.
- Q.No.5** State and explain Condensation and Addition polymerization with at least four examples in each case.
- Q.No.6** Explain the synthesis of organo-magnesium and organo-lithium compounds and their synthetic applications.
- Q.No.7** Explain the following rearrangements:
- Arndt-Eistert rearrangement
 - Baeyer-Villiger rearrangement
 - Hofmann rearrangement
 - Wagner Meerwein rearrangement
- Q.No.8** Explain the mechanism & scope of following named reaction
- Stobbe Condensation
 - Mannich Reaction
 - Perkin Reaction
- Q.No.9** Comprehensively discuss the mechanism and applications of Aldol Condensation.

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SUBJECT: - physical Chemistry

Paper: - I (Final)

Time Allowed: - 3 Hours.

Max Marks: 100

Note: attempt any five questions in all but Q no. 1 in section-I is compulsory and the time for section-I is only 40 minutes. After expiry of the time paper should be handed over to the examiner.

Section- I (20 marks)

Q1. Attempt 20 questions from the following. All carry equal marks.

1. Which is not an example of naturally occurring polymer
 - a. Protein
 - b. Wool
 - c. Cellulose
 - d. Nylon
2. Three dimensional cross links are formed in case of
 - a. Thermoplastics
 - b. Thermosetting plastics
 - c. Silk
 - d. None
3. Thermosetting plastics are
 - a. Linear polymer
 - b. Highly cross linked
 - c. Crystalline
 - d. None of these
4. Which of the following can be polymerized in to polythene
 - a. Ethylene
 - b. Ethyl acetate
 - c. Ethene
 - d. All of the above
5. Which of the following has weakest intermolecular forces
 - a. Sulphur
 - b. Ice
 - c. Phosphorous
 - d. Sodium fluoride
6. Diamond is an example of
 - a. Ionic bonding
 - b. Covalent bonding
 - c. Metallic bonding
 - d. Hydrogen bonding
7. Identify the system of crystals when $a=b=c$, $\alpha=\beta=\gamma \neq 90^\circ$
 - a. Hexagonal
 - b. Tetragonal
 - c. Triclinic
 - d. Rhombohedral

8. What helps in the study of the geometry of the internal structure of the crystal
 - a. Refraction of light
 - b. X-rays diffraction
 - c. Plane polarized light
 - d. None of these

Define the following

9. Single crystal
10. Incompressibility
11. Coordinate number
12. Face centered cube
13. Anisotropic solid
14. Cleavage
15. Elastic polymer
16. Glass transition temperature
17. Thermosetting plastic
18. Co-polymerization
19. Synthetic rubber
20. nylon
21. Photochemistry
22. photosensitizer
23. Thermal reaction
24. Quantum yield

Give reasons

25. Why quartz is crystalline solid
26. Whether glass is solid or crystal
27. Polyethylene is a polymer
28. Cellulose is a natural polymer
29. Extinction coefficient is different from molar extinction coefficient
30. Path length is effective on absorption of light

SECTION -II(SUBJECTIVE PORTION 80 MARKS) TIME ALLOWED 2:20

Attempt any Four (04) questions.

1. State and explain Beer's-Lambert law. Discuss its applications and limitations.
2. What are photochemical reactions? Why they differ from thermal reaction, also express one photo reaction in gas phase.
3. What is luminescence, how the "cold light" phenomenon occurs in photoreaction.
4. (a) What is polymerization?
(b) Explain step (condensation) polymerization kinetically.
5. Define fractionation of polymers, also elaborate this by discussing at least two methods for fractionation.
6. Viscosity can lead the determination of polymer molecular wt. express in detail the viscosity method for molecular weight determination.
7. (a) Differentiate crystals from general solids.
(b) Express unit cell.
8. What is symmetry? How many symmetry operations along with symmetry elements are present in a cubic system? Discuss with diagram.
9. Write Von-Laue x-ray diffraction method for crystal analysis.

SECTION-II

(Maximum Marks: - 80)

(Time allowed: - 2 Hrs 20 min)

NOTE: ATTEMPT ANY FOUR QUESTIONS FROM THIS SECTION. ALL QUESTIONS CARRY EQUALL MARKS.

- Q.NO. 2 What are the general principles of regulation of metabolic pathways?
- Q.NO. 3 Discuss active and passive transport across the membrane.
- Q.NO. 4 Describe the structure, activity, relationship and mode of action of antimalarial drugs.
- Q.NO. 5 Explain the process of ketogenesis in detail and also discuss ketosis.
- Q.NO. 6 Discuss the components of bacterial cell wall.
- Q.NO. 7 Explain the biosynthesis of O- linked glycoproteins also explain processing of N-linked glycoprotein.
- Q.NO.8 (a) Discuss the classification of glycoproteins.
(b) Briefly explain the functions of glycoproteins.
- Q. NO.9 Write notes on (any two)
- (a) Sulfa drugs.
 - (b) Inter conversion of food stuff.
 - (c) Enzymatic degradation of glycoproteins.

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Subject:-

CHEMISTRY
Inorganic Chemistry

Paper:- II (Final)

Time Allowed - 3 Hours

Max. Marks : 100

Note - Attempt any Five Questions in All But Question No. 1- in section -1 is compulsory and the time for Section- I is only 40 Minutes. After Expiry of the Time paper should be handed over to the supervisory staff.

SECTION -I (OBJECTIVE PORTION 20 MARKS)

Q. No. 1 Write short answers of any 20 out of 25 questions 2 × 20

given below.

- i. Differentiate between Kinetics and Kinematics?
- ii. What is meant by Substitution?
- iii. Give three uses of Helium gas.
- iv. What is a Unit Cell?
- v. What is meant by non-directional bonding in ionic crystal?
- vi. How Ionic Radii are measured generally?
- vii. Give two applications of IR Spectroscopy in Inorganic Chemistry?
- viii. Give two applications of NMR Spectroscopy in Inorganic Chemistry?
- ix. Why Diamond has highest melting point?
- x. Give examples of hydrides of halogens?
- xi. What are Boranes?
- xii. Write names of allotropes of Phosphorus?
- xiii. Name types of bending vibrations.
- xiv. What are Chlorate compounds? Give example.
- xv. What is meant by Order of reaction?
- xvi. Draw structure of Xenon hexafluoride?
- xvii. Why noble gases are placed in Zero group?
- xviii. Differentiate between Shielding and deshielding?
- xix. What are outer orbital complexes? Give two examples.
- xx. What are Redox reactions?
- xxi. Why noble gases have no electron affinity?
- xxii. Name any two non-metallic halides?
- xxiii. What is role of mass analyzer in Mass Spectrometry?
- xxiv. Show different oxidation states of Phosphorus with examples.
- xxv. Write names of Oxyacids of Chlorine.

SECTION -II(SUBJECTIVE PORTION 80 MARKS) TIME ALLOWED 2:20
Attempt any (04) Questions. All questions carry equal marks.

Q.No.2	Briefly explain the following: i) 3 center-2 electron bond in Boranes. ii) Commercial importance of Helium and Neon.	10+10=20
Q.No.3	(a) Discuss similarities and differences between Si and C. (b) Give chemical properties of oxyacids of Nitrogen.	10+10=20
Q.No.4	Derive an expression for the First order reaction when initial concentrations are same.	20
Q.No.5	Differentiate between Inert and Labile Compounds. Give dissociative mechanism for Substitution reactions of Octahedral complexes.	20
Q.No.6	Discuss nature of bonding and structure of Xenon compounds using concept of hybridization.	20
Q.No.7	Discuss factors that influence Chemical Shifts in N.M.R Spectroscopy.	20
Q.No.8	How Crystallography, NMR and IR Spectroscopy are helpful in structure elucidation of Inorganic Compound?	20
Q.No.9	Discuss chemistry of different oxyacids of Chlorine and give their structures.	20

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Subject:-

CHEMISTRY
Physical Chemistry

Paper:- II (Final)

Time Allowed :- 3 Hours

Max : Marks /100

Note - Attempt any Five Questions in All But Question No. 1- in section -I is compulsory and the time for Section-I is only 40 Minutes. After Expiry of the Time paper should be handed over to the supervisory staff.

SECTION -I (OBJECTIVE PORTION 20 MARKS)

Q. No.1 Write True or False on the following statements

1. Molecules having zero dipole show rotational spectra
2. Considering Stark Effect, if $\Delta v \propto (\mu^2)$, the molecule is linear
3. In I.R. line near is called Fundamental absorption
4. In I.R. lines near $2\omega_e$, $3\omega_e$ are called overtones
5. The I.R. spectra is based on transition of electrons
6. In Raman spectroscopy, if $K=0$ then $\Delta J = 0, \pm 1$
7. Symmetric vibrations give rise to intense Raman lines
8. Raman spectroscopy is essentially an emission spectroscopy
9. In NMR, I is the spin quantum number while μ_B is the magnetic dipole
10. In NMR, chemical shift measurements are done by TMS (tetramethyl silane)

B Define the following

- i) Translational partition functions
- ii) G-value in electron spin resonance spectroscopy
- iii) Hypsochromic shift
- iv) Term symbols in electronic spectroscopy of atoms

SECTION -II (SUBJECTIVE PORTION 80 MARKS) TIME ALLOWED 2:20

Note:- Attempt any Four Questions from this section.

Q # 2(a) /- Describe the Boltzmann distribution law

(b) Explain thermodynamic functions in terms of partition function.

Q # 3 (a) /- Describe the principle of LSR spectroscopy method with its experimental detail.

(b) What is hyperfine structure?

Q # 4(a) /- Discuss the principal and instrumentation of mass spectrometry

(b) ~~Define~~ High resolution method in mass spectrometry

Q # 5(a) Give a detailed description of I.R. spectroscopy

(b) How vibrational studies of gaseous diatomic molecules are done in I.R.

Q # 6(a) /- Describe the principle of NMR spectroscopy.

(b) Why TMS is used in NMR study.

(c) Give applications of NMR spectroscopy

Q # 7(a) /- Describe the principle and applications of Mossbauer spectroscopy

(b) Explain the method of interpretation of the Mossbauer spectra.

Q # 8 /- What notes on the following.

- i. Raman effect
- ii. Franck - Condon - Principle
- iii. Blue and red shifts
- iv. Reduced mass
- v. Building up principle

Q # 9(a) Describe method of production of lasers.

(b) Give detail of three level & four level laser production.

(c) Explain properties of lasers

Q # 10(a) /- Describe Lambert - Beer's law

(b) Explain positive and negative deviations in Lambert - Beer's law

(c) What is bathochromic shift

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Subject: CHEMISTRY PAPER-III (FINAL)
ANALYTICAL CHEMISTRY

Time allowed: 3 hrs.

Maximum marks: 100

NOTE: Attempt any five Questions. Question No. 1 is compulsory. Time for Question No. 1 is only 40 min. After this time, the Answer book should be handed over to supervisory staff. All Questions carry equal marks.

SECTION-I (20 Marks)

Question No.1: Distinguish between:

- i) automatic instrument and automated instrument
- ii) discrete and continuous automated devices
- iii) a precursor ion and a product ion
- iv) gaseous and desorption ionization sources
- v) retention factor and selectivity factor
- vi) gel filtration and gel permeation chromatography
- vii) adsorption and partition chromatography
- viii) retention time and retention volume
- ix) molecular ion peak and meta stable peak
- x) triplet state and resonance

SECTION-II (80 Marks)

Note: Attempt any four questions from this section. All questions carry equal marks.

- Question No. 2:**
- a) What is a feedback?
 - b) Describe the principles and components of segmented flow analyzer and its role in clinical laboratories.
 - c) Summarize the principal uses of computer in the analytical laboratory.
- Question No. 3:**
- a) Outline the major components of thermo gravimetric analysis.
 - b) Describe the analytical applications of differential thermal analysis.
- Question No. 4:**
- a) Describe basic principles of nuclear magnetic resonance (NMR) spectroscopy.
 - b) Explain various factors affecting chemical shift.
- Question No. 5:**
- a) Discuss why it is much easier to couple a gas chromatograph with a mass spectrometer than it is to couple a liquid chromatograph with a mass spectrometer.
 - b) How mass spectra can be predicted and interpreted?
- Question No. 6:**
- a) List the variables that lead to band broadening in chromatography.
 - b) Describe a method for determining the number of plates in a column.
- Question No. 7:**
- a) How does gas-liquid and gas-solid chromatography differ?
 - b) Describe the physical differences between capillary and packed columns. What are the advantages and disadvantages of each?
 - c) What is meant by temperature programming in gas chromatography?
- Question No. 8:**
- a) Describe the basic principles of high-performance liquid chromatography (HPLC).
 - b) Describe types of injection systems and pumps used in HPLC. What are the advantages and disadvantages of each?
- Question No. 9:** Write short notes on any two of the following.
- a) Centrifugal analyzer b) Spin-spin coupling c) GC detectors

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Inorganic Chemistry
Paper III Final

Time Allowed: 3Hr

Max Marks: 100

Note: Attempt any five questions in all, including Question No.1, which is compulsory. Time for question 1 is only 45 minutes. After 45 minutes paper should be handed over to supervisory staff

Question No.1

Marks: 20

Attempt any 20 question.

1. Write down the names of the elements of first transition series
2. What is zero valence
3. What is general oxidation salt of 1st transition series
4. Define transition metals
5. What type of magnetism exist in transition metal complexes
6. Name two vanadates
7. What is the oxidation state of vanadium in $[V(NCS)_6]^{3-}$
8. calculate the oxidation No of chromium in $Na_2[Cr(CO)_5]$
9. name two binary compounds of chromium
10. what are the different oxidation states of chromium
11. Draw the structure of $[Cr(O_2)_2 \cdot Bipy]$
12. Draw dodecahedral structure
13. Name two ores of iron
14. Give one example of Fe complex in trigonal bipyramidal and square pyramidal symmetry
15. what is tryrosinases
16. Draw crystal field diagram of strong and weak field ligand of Fe^{+2}
17. what are the higher oxidation states of iron
18. Define heme proteins
19. What is rubredoxin
20. Describe magnetism in cobalt
21. Write down some physical properties of cobalt
22. What is the cyano cobalamine
23. draw the structure of Bis(acetylacetonato) cobalt II
24. Give one example of trigonal bipyramidal complex of cobalt
25. Write down two biological importance of cobalt
26. Write down the names of two ores of nickel
27. Define anomalous properties of nickel
28. What is the action of copper as ascorbic acid in biological system
29. What is the role of copper in biological system
30. Write down the balanced equation of ammonia when it is passes over red hot copper

Section II

Note: Attempt any four questions. All questions carry equal marks.

- Q1. Write down the properties of transition metals in detail with special reference to magnetic properties.
- Q2. Criticize the oxidation states of vanadium
(b) Describe the oxovanadium (iv) compound
- Q3. Write a detail account of binary compound of chromium
- Q4. Describe the aqueous chemistry of iron in detail
- Q5. Write a detail note on simple salts and compounds of cobalt (III)
- Q6. Describe the compounds of cobalt having biological interest
- Q7. Describe the 5 coordinates Nickel (II) complexes, tetrahedral complexes, and planar complexes in detail
- Q8. Write down the all structural aspects of copper complexes
- Q9. Write a short note on any two of the following
- (i) Biochemistry of iron
(ii) Complexes of copper II
(iii) Draw molecular and crystal field diagram of the following complexes
- (i) $K_4Fe(CN)_6$ (II) $Co(EDTA)$

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Subject:-

CHEMISTRY
Organic Chemistry

Paper III Final

Time allowed:- 3 Hours

Max. Marks: 100

Note: - Attempt any Five Questions in All But Question No. 1 in section-I is compulsory and the time for Section-I is only 40 Minutes. After Expiry of the Time paper should be handed over to the supervisory staff.

SECTION - I

Q. No.1 Attempt any 20 Questions.

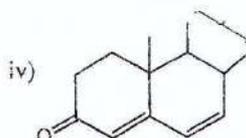
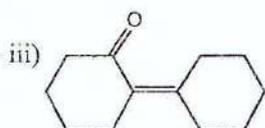
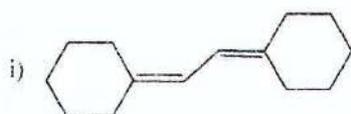
1x20

1. How the geometrical isomers can be differentiated with help of UV-VIS spectroscopy? Quote some example.
2. Define aldohexoses and ketohexoses with examples.
3. Define glycone and aglycone with examples.
4. Define reducing and non-reducing sugars with example.
5. How the finger print region in IR spectroscopy can be helpful for the identification of compounds?
6. Draw Fischer, Haworth and chair conformation for α -D-glucopyranose and β -D-glucopyranose.
7. Differentiate between cellulose and glycogen.
8. What does isotopic peak mean? Give example.
9. What is meta-stable ion? Give example.
10. Define base peak.
11. How can you differentiate between dimethyl ether and ethanol using IR Spectroscopy?
12. Define bathochromic effect.
13. Draw the structure of lactose.
14. Describe the spin-lattice relaxation in NMR spectroscopy.
15. How *cis* and *trans* isomers can be distinguished by NMR spectroscopy?
16. Differentiate between phenol and toluene by using mass spectrometry.
17. Describe the spin-spin relaxation in NMR spectroscopy
18. How Overtones play a role in IR Spectroscopy?
19. Write the IUPAC name of D-fructose.
20. What will be the product of reaction of D-glucose with
 - a. Acetic anhydride
 - b. HCN followed by hydrolysis
21. Define anomeric carbon and give two examples.
22. What is the difference between stretching and bending vibrations?
23. Why the UV bands are generally broader than IR bands?
24. Explain the difference between frequency and wave number.
25. What is the role of deuterated solvents in NMR Spectroscopy?

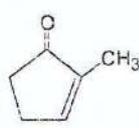
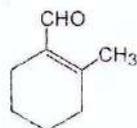
NOTE: ATTEMPT ANY FOUR QUESTION. ALL QUESTIONS CARRY EQUAL MARKS.

Q.No.2 a) Calculate the λ_{\max} for given compounds according to Woodward-Fieser 4x4 rules.

Note: Base value for parent homoannular diene = 253; parent heteroannular diene = 214, parent acyclic diene = 217; parent acyclic or six & higher membered ring ketone = 215; alkyl group or ring residue (α) = 10; alkyl group or ring residue (β) = 12; -OH (α) = 35 nm; -Br (α) = 35 nm.



b) Calculate λ_{\max} of following compounds using Woodward Fieser rules. 2x2



Q.No.3 a) Discuss with suitable examples, the following factors which affect the absorption frequencies in IR spectroscopy. 4x2

- i) Electronic effects ii) Hydrogen bonding

b) How can you distinguish between following pairs of compounds with the help of IR spectroscopy? 4x3

- a) $\text{CH}_3\text{C}\equiv\text{CH}$ & $\text{CH}_3\text{C}\equiv\text{N}$
 b) PhCONH_2 & PhCH_2NH_2
 c) 2-Hexanol and 2-Hexanone

Q.No.4 a) Discuss the magnetic anisotropic effect on the shielding of a proton with suitable examples. 10

b) Elaborate the working and principle of an analyzer for a single-focusing mass spectrometer. 10

Q.No.5 a) Suggest all the possible isomers (four) having molecular formula $\text{C}_4\text{H}_6\text{O}$ whose UV spectra show a high-intensity peak at about 190 nm and a low-intensity peak at about 280 nm. 4x3

b) Define and explain the following terms. (i) Spin-Spin Splitting (ii) Pascal triangle. 4x2

Q.No.6 a) Draw schematic diagram of double beam UV spectrophotometer and explain functions of its different parts. 14

UNIVERSITY OF BALOCHISTAN QUETTA
MA / MSc (ANNUAL) EXAMINATION .2014.

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SUBJECT:

CHEMISTRY
(Physical Chemistry)

PPAPER: III (Final)

Time Allowed: 3 Hours.

Max: Marks: 100

Note: Attempt any Five Questions in all but Question No.1 in Section -1 is compulsory and the time for Section -1 is only 40 Minutes. After Expiry of the Time paper should be handed over to the Examiner.

Section – 1 (20 Marks)

Question No. 1. Attempt any 20 questions out of 30 questions. All Questions carry equal Marks.

1. What are non-metallic catalysts?
 2. What is catalytic reforming?
 3. Define the term "CONDUCTANCE".
 4. Give one example of mixed adsorption.
 5. Define the term "DIFFUSION".
 6. What do you mean by a surface reaction?
 7. Give one example of homogeneous reaction.
 8. Differentiate between localized and non-localised adsorption.
 9. Differentiate between adsorption and absorption.
 10. Work out the Unit of equivalent conductance.
 11. What does Auger Electron Spectroscopy tell us?
 12. Deduce the Unit of molar absorption coefficient.
 13. What is Lambert's Beer Law?
 14. Give one example of bifunctional catalyst.
 15. What does ESCA tell us?
 16. Give one example of oxide catalyst.
 17. Explain dehydrogenation process.
 18. What is NO_x abatement?
 19. Give one example of bimolecular surface catalyzed reaction.
 20. Write Temkin and Fowler equation.
 21. Define the term adsorption Isotherm.
 22. Name 2 methods for the determination of surface area of adsorbants.
 23. Define the term Potential energy.
 24. How do you calculate heat of adsorption?
 25. Define heat of neutralization.
 26. Define the term "rate".
 27. How do you show that rate of a reaction is expressed in concentration / time?
 28. What is a catalytic reaction?
 29. Define the term specific conductance.
 30. What are the assumptions of Langmuir Adsorption theory?
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