

UNIVERSITY OF BALOCHISTAN QUETTA

MA/MSC (ANNUAL) EXAMINATION ,2015.

- Attention:-
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Subject:- CHEMISTRY . Paper:- II (Final)
Time Allowed :- 3 Hours Analytical Chemistry 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 Give short answers:- (Attempt all)

- Hertz is the unit of -----:-
a) Wavelength b) Energy c) Frequency
- The EMR source is kept at right angle to the detector in -----
a) Fluorescence measurement b) Atomic absorption spectrophotometry c) UV – Visible spectrophotometer .
- The instrument which uses photographic plate as detector is called ----
a) Spectrograph b) Spectrometer c) Photometer .
- Detectors that measure more than one wavelength simultaneously are called ----
a) Photo tube b) PM tube c) Multichannel detector .
- The smallest angle of incidence at which total inter reflection occur is called -----.
a) Critical angle b) Reflection angle c) absorption angle .
- The filters which transmit radiation within a range of 20 nm to 70 nm wide are ----
a) Interference filter b) Band Pass filters c) Sharp cut off filters .
- In flame emission spectrometry the excitation source is -----
a) EMR b) Furnace c) Flame .
- If the excitation source is EMR , The luminescence technique is called ----
a) Photoluminescence b) Chemiluminescence c) Bioluminescence .
- Phosphorescence occurs when electrons are de excited from excited ----
a) Singlet – Triplet b) Triplet – Triplet c) Triplet to singlet .
- Scintillation indicators are used in -----
a) UV – Visible spectrophotometer b) x-Ray method c) Atomic absorption spectrophotometry .

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

Attempt any Four (04) questions.

- Q.2. a) Describe the working curve method and standard addition technique as applied in quantitative spectrophotometric methods .
b) Differentiate between dispersion and resolution explain the working of diffraction grating .
- Q.3. a) What is meant by spectral line width describe different types of spectral line broadening encountered in Atomic absorption spectrophotometry (AAS).
b) Discuss different types of Furnaces used as atomizer in AAs
- Q.4. a) What is the principle of flame emission spectrometry (FES) Elaborate the interferences encountered in FES.
b) How Atomic emission spectrometry is performed with electrical discharges . Describe different types of electrodes used for AES.
- Q.5. a) Describe the principle and working of single beam and double beam spectrophotometers what are the advantages of double beam instrument over single beam instrument .
b) What is isopiestic point ? What is the criteria for choosing work length for absorbance measurement .
- Q.6. a) Describe the principle of electro chemiluminescence Discuss the methods applied for electro generation of radical ions .

b) Write a detailed note on gas phase chemiluminescent Analysis

- Q.7. a) Differentiate between fluorescence and delayed fluorescence describe different types of delayed fluorescence .
b) How Fluorescence is used for the quantitative analysis of luminescing and non luminescing compounds .
- Q.8. a) Describe the detectors used in infrared (IR) Spectrophotometers .
b) Explain the principle and working of Fourier transform IR spectrophotometer .
- Q.9. a) How x-Ray absorption methods is used pr Chemical analysis .
b) Differentiate between the wave length dispersive and energy dispersive x-ray fluorometers
Draw labelled sketch of both instruments .
- Q.10. Write note on any three of the followings:-
a) Beer's Law .
b) Hollow cathode Lamp .
c) DC Arc .
d) Prism monochromator .
e) EMR sources in IR spectrophotometry .

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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

Question No. 1(a): Define the following terms.

- | | | |
|------------------------------------|----------------------------|-----------------------------------|
| i Retention time and volume | ii Limit of quantification | iii Limited and medium dispersion |
| iv Meta stable ions | v Bits, bytes and words | vi Reverse phase packing |
| vii Direct injection enthalpimetry | viii Mass spectrum | ix gradient elution |
| x Discrete analyzer | | |

(b) Distinguish between:

- i) automatic instrument and automated instrument
- ii) a precursor ion and a product ion
- iii) retention factor and selectivity factor
- vi) gel filtration and gel permeation chromatography
- v) molecular ion peak and meta stable peak

SECTION-II

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

- Question No. 2:**
- i) Describe the principles of auto-analyzer and flow injection analysis. Draw the manifolds of each and explain their various components.
 - ii) Describe principles of automation.
- Question No. 3:**
- i) How differential thermal and thermo gravimetric analyzer work? Explain with examples.
 - ii) Describe quantitative applications of thermometric titrations
- Question No. 4:**
- i) Describe the theory of nuclear magnetic resonance (NMR) spectroscopy.
 - ii) Describe various factors affecting chemical shift.
- Question No. 5:**
- i) Give comparison of mass spectrometer with other spectroscopic techniques.
 - ii) How mass spectra can be predicted and interpreted?
- Question No. 6:**
- i) What is the description of chromatography?
 - ii) What is van Deemter equation? Define terms.
- Question No. 7:**
- i) When would you use split, split-less or on column injection in GC.
 - ii) Explain, how flame ionization, thermal conductivity and electron capture detectors function?
- Question No. 8:**
- i) Describe the principles of high performance liquid chromatography (HPLC).
 - ii) Describe various kinds of injectors and pumps used in HPLC. What are the advantages and disadvantages of each?

Question No. 9: Write short notes on the following

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Subject:-

CHEMISTRY .

Paper:- IV (Prev)

Time Allowed :- 3 Hours

Analytical Chemistry

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 Give short answers:- (Attempt any 20)

- i. Detection limit
- ii. Random Sample .
- iii. Correlation Coefficient
- iv. Accuracy
- v. Quantitative analysis .
- vi. Resolution .
- vii. Super saturation .
- viii. Conjugate Acid – Base pair .
- ix. Co – Precipitation .
- x. Packed column .
- xi. Diffusion Co – Efficient .
- xii. Capacity factor .
- xiii. Rf .
- xiv. Masking agent
- xv. Primary standard .
- xvi. Blank .
- xvii. Dialysis .
- xviii. Desiccant
- xix. Gaussian curve
- xx. pH
- xxi. Analytical instrument.
- xxii. Potential .
- xxiii. Absorption
- xxiv. Buffer capacity .
- xxv. Law of mass action
- xxvi. End point
- xxvii. EMR
- xxviii. Solvent extraction
- xxix. Chromatograph
- xxx. Indicator .

SECTION –II(SUBJECTIVE PORTION 80- MARKS) TIME ALLOWED 2:20
Attempt any Four (04) questions.

- Q.2. a) What is co precipitation .
b) List various CO-precipitants .
c) Calculate the weight of sodium present in 50g of H_2SO_4
- Q.3. a) Explain types of errors in determinations .
b) What do you understand by instrumental analysis .
- Q.4. a) Define electrochemical cell .
b) Explain working of standard hydrogen electrode and its use as reference electrode .
- Q.5. What are various type of electrodes . Explain Glass electrode .
- Q.6. a) Define common ion effect and solubility product .
b) Find the solubility (Gaus per litre) of Ca SO_4 (FW 136.14) in i) Distilled water
ii) 0.05 M CaU_2 $K_{\text{spc CaSO}_4} = 1.9 \times 10^{-4}$
- Q.7. Explain concept of solvent extraction what are important parameters that affect the extraction efficiency .
- Q.8. a) Describe acid – base indicator with example
b) Explain the weak acid – strong base titration curve .
c) Write down the analytical applications of EDTA.
- Q.9. a) Define Chromatography and classify chromatographic techniques and give their analytical applications .
b) Derive and explain Beer's Lambert Law Write down the deviations from Beer's Law .
- Q.10. a) Explain polarography and its three electrode system .
b) What is difference between voltammetry and polarography . Give details about various electrodes in voltammetry .
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SUBJECT: -

ALLOWED: - 3 HOURS

CHEMISTRY
BIO CHEMISTRY

PAPER: - Final-II

MAX: MARKS:-100

NOTE: - ATTEMPT ANY FIVE QUESTIONS INCLUDING QUESTION NO.1. WHICH IS COMPULSORY TIME FOR QUESTION NO.1. IS ONLY 40 MINUTES. AFTER 40 MINUTES PAPER SHOULD BE HANDED OVER TO SUPERVISORY STAFF

SECTION-I

ATTEMPT 20 QUESTIONS OUT OF 30 QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q.No.1.

01. Name the key enzymes of gluconeogenesis.
02. Write down the structural formula of cAMP
03. Write down the structural formula of N-acetylneuraminic acid.
04. Write down the structural formula of Fucose.
05. Write down the structural formula of Mannose.
06. What is dipeptide draw the structure formula.
07. What is Morquio's syndrome?
08. What is Hurler's syndrome?
09. Define glycosaminoglycans.
10. Define cerebrosides.
11. What are receptors.
12. What is action potential.
13. Define sodium-potassium pump.
14. Define osmotic pressure and osmolality.
15. Define the systolic and diastolic blood pressure.
16. Name the starting material for ketogenesis.
17. What do you mean by renal threshold.
18. What is the effect of increased malonyl-CoA on β oxidation of fatty acids?
19. How many methods of oxidation exist in our body?
20. What is the effect of citrate in the regulation of fatty acids biosynthesis?
21. Which amino acids are involved in the synthesis of glucose through pyruvic acid?
22. Which hormone regulates the glycogen metabolism in the muscles and other tissues?
23. Define blood group antigen?
24. Differentiate between active and passive transport.
25. What is the difference between endoglycosidase and exoglycosidase?
26. What are two major components of peptidoglycans?
27. Write down the sequence of di-N-acetylchitobiose.
28. Define analgesic.
29. What is the action of aspirin in thrombus formation?
30. Name different types of fatty acids oxidation.

ATTEMPT ANY FOUR QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

- Q. NO.1. Explain the process of glycolysis in detail. How do the three irreversible steps regulate the process of glycolysis? What is the energy yield of this pathway?
- Q. NO.2. What are Proteoglycans, explain with the structure of polysaccharides present in proteoglycans, and also indicate the point of linkage between the protein and polysaccharide.
- Q. NO.3. Write a short note on the synthesis of Cholesterol. Name the precursor of the synthesis of Cholesterol from palmitate?
- Q. No.4. Discuss the mechanism of action of protein kinase C.
- Q. NO.5. Discuss in detail about the structure and function of transport vesicles, cell membrane.
- Q. NO.6. Describe the structure and function of the cell wall of bacteria. Mention the function of antibiotic drugs.
- Q. NO.7. Write short notes on the following: (any two)
- Q. NO.8. Explain the basic structural processing of a protein.
- Q. NO.9. Write short notes on the following:
- Angiogenesis
 - Apoptosis
 - Protein synthesis

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SUBJECT CHEMISTRY PAPER: IV (PREV.)

TIME ALLOWED: – 3 HOURS BIO CHEMISTRY MAX: MARKS: – 100

NOTE:– ATTEMPT ANY FIVE QUESTIONS IN ALL INCLUDING QUESTION NO. 1 WHICH IS COMPULSORY. TIME FOR QUESTION NO.1 IS ONLY 40 MINUTES. AFTER 40 MINUTES PAPERS SHOULD BE HANDED OVER TO THE SUPERVISORY STAFF.

SECTION-I (MARKS 20)

Q. No. 1. ATTEMPT ANY TWENTY QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS. (20 Marks)

1. Enlist the essential amino acids.
2. What is the PH of saliva, urine and blood?
3. Define active site.
4. Which vitamin plays an important role in the process of blood clotting?
5. What is dipeptide? Give example.
6. What is the function of ligases?
7. Which inorganic ion acts as an activator for the enzyme salivary amylase?
8. Name the bile acids.
9. Define optimum temperature as well as optimum PH with respect to enzyme activity.
10. Define buffer solution with one example.
11. Define osmosis.
12. What are the basic components of a prokaryotic cell?
13. What are coenzymes? Give some examples.
14. Define isosmotic solution.
15. What is the function of rRNA?
16. Define fluid mosaic model.
17. Define energy of activation.
18. Give some characteristics of colloids.
19. Calculate R.Q for the following equation.



20. Define acids & bases in terms of Lewis concept.
21. Define K_a & pK_a .
22. Give formulas for lecithin & cephalin.
23. What are colloids? Give some examples.
24. Define thixotropy.
25. Name the intermediates of Kreb's cycle.
26. Name the sulphur containing amino acids. Also draw their structures
27. What are sphingomyelins?
28. What is Zwitter ion?

SECTION-II

(Maximum Marks: - 80)

(Time allowed: - 2 Hrs 20 min)

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

- Q.NO. 2 Derive Handerson Hassel Balch Equation. Also give its applications in detail.
- Q.NO. 3 Explain Embden Mayer Hoff pathway in detail. Also draw flow sheet diagram for the process and calculate the number of ATP formed during the process.
- Q.NO. 4 Explain the 4 levels of structural organization of proteins in detail.
- Q.NO. 5 What is oxidative phosphorylation? Explain electron transport chain in detail along with flow sheet diagram.
- Q.NO. 6 Write a detail note on mitochondria, chromosomes, Golgi bodies & peroxisomes.
- Q.NO. 7 (a) Explain the process of translation.
(b) What do you know about post translation modification?
- Q.NO. 8 (a) Explain the process of Beta oxidation of fatty acid.
(b) Explain the types of unsaturated fatty acids along with their formulas.
- Q.NO. 9 Write down chemistry, occurrence, function, deficiency symptoms and requirement of vitamin D in detail.
- Q.NO.10 Write short notes on the followings.
- (a) Starch
 - (b) Creatinine synthesis.
 - (c) Uric acid biosynthesis.

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Subject: - (CHEMISTRY)
Environmental Chemistry

Paper: - IV (Final)

Time Allowed: - 3 hours

Max. Marks: 100

Note: - Attempt any Five Questions in total. Question No. I- in section I is compulsory and the time for Section – I is only 40 minutes. After expiry of time the paper should be handed over to the supervisory staff.

SECTION – I (OBJECTIVE PORTION 20 MARKS)

- Q.No.1.a. Define the following. Write down sources of each of them. (08)
- i. POP's
 - ii. Heavy Metals
 - iii. Nuclear waste
 - iv. Acid rain
- b. Differentiate between (12)
- i. BOD and COD
 - ii. Bioaccumulation and bio amplification
 - iii. Fog and smog
 - iv. Indoor and outdoor pollution
 - v. Catalytic and non-catalytic destruction of ozone layer

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

Attempt any four (04) questions

- Q.No.2 What do know about environmental degradation? Explain the impacts of the modern life style on environmental quality.
- Q.No.3 Write in detail the role of institutions working for the protection of environment.
- Q.No.4 What is ozone depletion and what are its harmful effects? What protective measure should be taken to save life on earth?
- Q.No.5 Elaborate in detail the primary, secondary and advanced treatment of water.
- Q.No.6 Write in detail the impacts of chemicals on human health, buildings and monuments and aquatic life.
- Q.No.7 What is soil erosion? What steps can be taken for the reclamation of soil.
- Q.No.8 What do you know about environmental legislation in Pakistan? What vital role does monitoring plays in environmental pollution?
- Q.No.9 Write short note on the following:
- a. Micro and macro nutrients in soil
 - b. Concept of green chemistry