I- Geotectonics

Write on the following:
1. Structure of the earth
2. Characteristics of plate boundaries.
3. Types of continental margins.

II. Well Logging

Answer the Following Questions:
1. Write on TWO of the following:
   a. How well logs are created?
   c. Caliper logs.

2. There is a clear relation between the thickness of beds and resistivity curves, explain?

3. Write on the electromotive forces as a source of Self potential (SP).
[1] Define:
1. **programming language**
2. **compiler**
3. **A token**
4. **data type**
5. **Law of cooling**
6. **Radioactive decay**

[2] Detect if the following statements are valid (✓) or wrong (✗). Correct the wrong statements.
1. Starting a Fortran line, with an ampersand, means a comment for the benefit of the reader, and has no effect on the compilation.
2. If a statement is too long to fit on a line, it will be continued on the next line if the last non-blank character in it is an exclamation mark.
3. Fortran 90 insists that certain parts of a statement start in certain columns.
4. The only compulsory statement in a Fortran program is PRINT.
5. Except in the case of character strings, Fortran 90 is case sensitive.

[3] (a) State Kirchhoff’s Law for voltage changes around a closed circuit.
   Use Kirchhoff’s Law to define the initial value problem that control the following circuit.

(b) ![Circuit Diagram]

   where: a: 4 ohm, b: 0.5 farad, c: 6 Ohms, e: 12 volts, f: 2 Henrys.

(c) Discuss a suitable algorithm for solving the problem in (b).

(d) Find the value of the currents in the two circuits at t=0.1.

[4] (a) Write down the hints that can improve your programming style.

(b) Discuss Heun’s method for solving IVP for ODE’s.

(c) Use Heun’s method of order two to find y(2.5) for the problem:

\[ y' = y + t, \quad 1 \leq t \leq 3, \quad y(1) = 5 \]
South Valley University
Faculty of Science at Qena
Chemistry Department

Final Examination of Analytical Chemistry for B. Sc. Students (Geology Group)

Answer five questions of the following:

1. Solid phase extraction (SPE) is a good method for sample preparation prior to instrumental analysis. Discuss, showing the following:
   a) Types of SPE media.
   b) Method of SPE operation.
   c) Types of SPE devices, advantages and limitations of each.

2. Show the construction and method of operation of the following instruments:
   a) Graphit furnace.
   b) Hollow cathode lamp.
   c) Coolidge tube.

3. Discuss main ideas, theoretical basis and instrumentation of the following sample preparation methods:
   a) Supercritical fluid extraction.
   b) Accelerated solvent extraction.

4. Write on the following:
   a) Three different applications of Beer-Lambert law in quantitative analysis.
   b) Solid phase microextraction device and its operation.

5. Explain each of the following:
   a) Stages of an analytical process.
   b) Moseley equation.
   c) Difference between accuracy and precision of an analytical result.
   d) Types of x-ray spectra and the importance of each.

6. Atomic absorption spectrometry and x-ray are two instrumental methods for the analysis of low and high atomic weight elements. Explain the main concept of each and show the following:
   a) Types of burners in atomic absorption spectrometry.
   b) Two different types of x-ray spectrometers.

***********************************************************************

BEST WISHES
Answer the following questions:

Section (A) Mycology

Answer the following questions

1- Give an account of each:
   A- Sexual reproduction in phycomycetes
   B- Economic importance of *Aspergillus*
   C- Spermatization in fungi

2- Explain the following:
   a- Economic importance of *Claviceps*
   b- Vegetative reproduction in fungi

Section (B) Host-parasite interaction

1- Write briefly about:
   Necrotrophs and biotrophs - Appressorium - gene for gene theory-
   Koch's postulates.

2- Discuss in details the morphological or structural defense mechanisms in plants, giving examples.

3- Pathogenesis is a process or the chain of events by which disease development takes place. Discuss this statement in details giving examples.

GOOD LUCK
\[ M(N_{\text{H}^+}) = 1400.7518 \text{ a.m.u.} \]
\[ M(H^+) = 1.008144 \text{ a.m.u.} \]

\[ M(N^+) = 1400.7518 \text{ a.m.u.} \]
\[ M(H^+) = 1.008144 \text{ a.m.u.} \]
Answer The Following Questions:

I. Discuss the Newton’s method of solving an equation in one variable, \( f(x) = 0 \), geometrically, and then give the analytical proof.
- Find the root of \( x^4 - x^2 = 80 \), starting with \( x_0 = 3 \).
Give the solution correct to 4 D.

II. Explain the method of triangular decomposition in giving the solution of linear simultaneous equations.
- Find correct to 2D the values of \( \chi_1 \), \( \chi_2 \) and \( \chi_3 \) which satisfy the following equations

\[
\begin{align*}
4.44\chi_1 - 9.94\chi_2 + 2.41\chi_3 &= 5.36, \\
8.24\chi_1 + 2.02\chi_2 - 2.18\chi_3 &= 9.34, \\
0.93\chi_1 + 3.86\chi_2 + 11.65\chi_3 &= 2.57,
\end{align*}
\]

III. In the methods of numerical integration explain the following rules,
   a) Trapezoid rule  
   b) Mid-ordinate rule  
   c) Simpson’s rule

- Use the Simpson’s rule to evaluate \( \int_0^{\pi/2} \sin x \, dx \), make use of the values given in the next table.

<table>
<thead>
<tr>
<th>( \chi )</th>
<th>0</th>
<th>15°</th>
<th>30°</th>
<th>45°</th>
<th>60°</th>
<th>75°</th>
<th>90° (( \pi/2 ))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sin ( \chi )</td>
<td>0</td>
<td>0.2598</td>
<td>0.500</td>
<td>0.7071</td>
<td>0.8660</td>
<td>0.9659</td>
<td>1.000</td>
</tr>
</tbody>
</table>
[1] (a) Discuss Euler method for solving IVP for ODE's.
(b) Use Euler method of order two to find \( y(2.5) \) for the problem: \( y' = y^2 + t, \quad 1 \leq t \leq 3, \quad y(1) = 5 \)

[2] (a) Discuss a method to solve a system of IVP for ODE's.
Use the method in (a) to solve
(b) \( \frac{dy}{dx} = x + y_1 + y_2, \quad y_1(0) = 1 \)
\( \frac{dy_2}{dx} = 1 + y_1 + y_2, \quad y_2(0) = -1 \)
(c) Use the shooting method to solve the following BVP
\( \frac{d^2y}{dx^2} + 2 \frac{dy}{dx} - 0.5y - 2.5 = 0, \quad y(0) = 10, y(1) = 6 \)

[3] (a) Discuss Least squares Approximation to find a best curve for a set of data \( \{(x_i, y_i) \mid i = 1, 2, \ldots, m\} \).
(b) Find the vector \( y \) that minimizing the sum of the squares of the relative error
\( E = \sum_{k=1}^{2} \sum_{j=1}^{N} \left( \frac{y_k^2 - p_j}{y_k} \right)^2 \)

[4] State the theorem that an orthogonal set of polynomials if the weight function is known.
Use the theorem in (a) to construct the Laguerre polynomials associated with the weight function \( w(x) = e^{-x} \) in the interval \([0, \infty)\).
أجب عن الأسئلة الآتية:

1 - 1 - تؤثر الجاذبية الأرضية على مكونات الغلاف الجوي، استنتج معادلة رياضية بين ذلك.
   - ب - أوجد المعادلة التي تبين تغير الضغط الجوي بتيغير درجة الحرارة.
   - ج - ج 1 يساوي ....... / سم² = ............ بيكال / كم.

2 - 1 - استنتج نموذجاً رياضياً لتعيين درجة حرارة الأرض (طريقة تقريبية).
   - ب - أشرح دوره البيرة-برتون في منع الطاقة الشمسية.
   - ج - بين تركيب وعمل أحد الأجهزة التي تستخدم لقياس الأشعاع الشمسي.

3 - 1 - وضح بالرسم هيئة تغير درجة الحرارة بتيغير الارتفاع خلال طبقات الغلاف الجوي.
   - ب - بين كيف يفقد الأوزون انعكاسه في طبقة الستراتوسفير.
   - ج - استنتج معادلة رياضية تبين عن التناسق الحاري للهواء الجاف.

4 - 1 - ماهي الأشكال الأساسية للسحب - بين في إيجاز أهمية تكون السحب.
   - ب - أشرح مستعيناً بالرسم كيفية تعيين سقف السحبة - الأطعمة - السرعة.
   - ج - هواء صاخب على سطح جبل - من الشكل السابق استنتج:

   * معدل التناسق الحراري لوسط المحيط * مستوى الارتفاع الذي يحدث عند التكالف وتكوين السحب.

   * درجة حرارة الهواء الصاعد - نقطة القيروان عند ارتفاع 3كم * حالة استقرار الهواء من عدمه.

   * درجة الارتفاع نقطة القيروان عند سطح الأرض في حالة هبوطه من ارتفاع 3كم

(درجة الارتفاع المحيط = Te - الارتفاع) - درجة الارتفاع المرتفع عند سطح الأرض = Z - نقطة القيروان = 2كم - معدل التناسق للهواء الجاف = 10كم / كم (تصلب = 1كم / كم نقطة القيروان = 2كم / كم).

<table>
<thead>
<tr>
<th>Te</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>-14</td>
<td>3Km</td>
</tr>
<tr>
<td>-6</td>
<td>2Km</td>
</tr>
<tr>
<td>2</td>
<td>1Km</td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
Answer the following questions

1- In detailing write on:-

a- The formation of the dermatocranium.
b- Modification of aortic arches of Amniota.
c- Dermal derivatives in vertebrates.

2- Follow up:-

a- The Evolution of Epidermal layer in different chordates by diagrammatic only.
b- The development of the three types of the mature kidney.

3- Explain with figures and labels: -

a- The type of Jaw suspension in cartilaginous fishes.
b- The development and types of mammalian glands.
c- The splanchnocranium.

GOOD LUCK

Dr. Kh. Ammar
I- Special course

Write on the following:

1- What is the active tectonics?
2- Why we study active tectonics?
3- Drainage anomaly.
4- The morphotectonic parameters to evaluate active tectonics.

II- Basement Complex

Write on three of the following:
1- The Meatiq gneisses – Tectonic setting of El Ghadir ophiolites
2- Metavolcanics in the Central Eastern Desert.
3- Classification and depositional environment of the Hammamat sediments.
4- Composition and tectonic setting of older and younger granitoids.
Section I: *Industrial chemistry*

1) Cellulose is considered a good source for the manufacture of synthetic fibers, and artificial woods. Illustrate with chemical equations.

2) Write shortly on the manufacture of: Perfumes, Musk's, and Agrochemical (Give one or two examples for each.)

3) Sugar cane is the main source for obtaining the sugar. Can you describe briefly the main industrial processes.

4) The manufacture of inks and pigments is introduced for getting a different Colors. Write on the synthetic tools for obtaining the different colors, with reference to the shadow and intensity properties.

Section II: *Polymer chemistry*

a) Define:
- polymerization-
copolymer-
homopolymer-
graftcopolymer-
plasticizer-
antioxidant

b) Write shortly about:
- Homochain and Heterochain
- Cationic polymerization

c) How can you synthesis the following polymer:
- polyethylene terephthalate
- Nylon 6,6
- phenol-formaldehyde resin
- polystyrene.

Section III: *Chromatography*

1) Write shortly on the following:
   a) preparation of plates in TLC
   b) The differences between cellulosic fibers in paper chromatography and cellulosic fibers in TLC
   c) Elution procedure in column chromatography

2) Discuss in brief:
   a) Flame ionization detector
   b) Solvent delivery system
   c) The column and column oven

وَاللهُ الحَمِيدِ