



Q₁- Answer as true (✓) or false (X)

[20] Marks

1. Nanotechnology is research and development to control or manipulate matter on molecular or atomic scales, with lengths between 1 – 100 μm
2. Electrophoresis of positively charged particles is called anaphoresis
3. Biomes are all possible ecosystems
4. To obtain crude nuclei, the cells must be centrifuged at 700 g for 10 min
5. Separating funnel is used in liquid-liquid extraction technique
6. Many toxicity tests examine specific types of adverse effects, known as "endpoints"
7. Power stations are examples of the diffuse pollution
8. 1 mg/kg = 1 μg/ml = 1 ppm
9. Nanorobots moves with blood stream and guided with laser
10. Noise pollution affects nesting of songbirds

Q₂- Choose the correct answer:

[20] Marks

1. A hazy layer called may hang over industrial cities indicates to air pollution
a) smog b) fog c) smut
2. is toxic symptoms are expressed after multiple doses for a short time or timeframe < ½ the life- time of the organism and can cause reversible side effects
a) chronic toxicity b) subchronic toxicity c) acute toxicity
3. is a technique of instrumentation
a) protein precipitation b) centrifugation c) spectrophotometry
4. Survival and reproduction are biomarkers at the organization level
a) cells b) individual c) community
5. Ecosystem is a core concept in and Ecology
a) biology b) geology c) histology

6. All ecosystems are requiring a net flow of energy to persist.
 a) open systems b) closed systems c) both of them
7. is a tool may detect and treat the cancer in a very small amount of cells
 a) nano-engineering b) nano-device c) nano-science
8. In the planar chromatography, the stationary phase is
 a) glass b) aluminum sheet c) a fine powder
9. confirm diagnosis of acute or chronic disease as cancer tumors
 a) bioassays b) biomarkers c) bioindicators
10. deals with subatomic level as duration pulses of electrons or photons to probe dynamic processes in matter with unprecedented time resolution
 a) Attoscience b) Femtoscience c) Nanoscience

Q₃- Choose the alien word(s)

[30] Marks

1. spectrophotometry – electrophoresis – centrifugation – chromatography
2. 10^9 am – 10^6 fm – 1000 pm – 100 nm – 10 μ m
3. water – consumer – primary producer – energy – decomposer
4. fitness – biomarker – biodiversity – bioassay – animal density
5. shipping – dust of solid rocket motors – space missions – satellites – aircrafts
6. LD₅₀ – LC₅₀ – mortality – dose – test animals
7. pesticides – biodegradable – domestic wastes – sewage – plastics
8. zone plate – nanotechnology – biosensors – virus – 10^{-15} second
9. biosphere – populations – organs – Earth – biomes
10. diarrhea – cough – water – typhoid – pollution

Q₄- Compare between both of:

[10] Marks

1. Liquid chromatography and gas chromatography
2. Effects of air pollution and water pollution on human health

,,, BEST WISHES ,,,

Dr. Waleed Khaled Elaidy

<p>Mansoura University Faculty of Science Chemistry Department Subject code: Chem. 415 Course: Electro-analytical chemistry and spectroscopic methods of analysis</p>		<p>First semester examination 4th level students Program: Chemistry/Zoology and Chemistry/Botany Date: 12/1/2016 Time allowed: 2 hours Full mark: 80 marks</p>
---	---	---

Answer the following questions: (الأسئلة في صفتين)

Section A: (Spectroscopic methods of analysis) (40 marks)

Question 1: (20 marks)

a. Define each of the following: (10 marks)

1. Electromagnetic radiation.
2. Wave length.
3. Scattering.
4. Auxochromes.
5. I.R active substances.

b. Draw the diagram which represents: single beam instrument. (5 marks)

c. Calculate the molar absorptivity of: $K_2Cr_2O_7$ at 455 nm, given that 36.5 mg was dissolved in 500 mL exhibits 12% transmittance at 455 nm in a 2-cm cell. (5 marks)

Question 1: (20 marks)

a. Put true (✓) or false (×) and correct the wrong one: (10 marks)

1. According to Beer's law, $A \propto 1/C$.
2. During the interaction between EM radiation and matter, the type of excitation independent on the wave length of the light.
3. Wagging vibration involves change in bond length.
4. Spectroscopic methods are not classified according to the region of the electromagnetic spectrum.
5. The colour in $KMnO_4$ is due to defect in crystal.

b. Complete the following: (10 marks)

1.lamp is a source for I.R radiation while..... lamp is a source for U.V radiation.
2.is an example for I.R detector.
3. Electrons are promoted to higher orbitals by.....while vibrations are excited by.....and rotations are excited by
4. Bathochromic shift is a shift to and it also called
5. Hypso-chromic shift is a shift to....and it also called

Please turn the page →

Section B: (Electro-analytical chemistry) (40 marks)

Question 3: (20 marks)

a. Complete each of the following sentences: (5 marks)

1. In static method.....passes through the electrochemical cell like.....
2. Electrodes of the fourth kind can follow the reaction mechanism for
3. Coulometry requires **100%** current efficiency which means:.....
4. For **CPC** technique, two types of working electrodes are commonly used:.....or.....
5. Irreversible peak current is proportional to:.....and.....and.....

b. Put true (✓) or false (×) and correct the wrong one: (5 marks)

1. Galvanostat is a device used to control the current in the dynamic methods.
2. Potentiometric end point of acid-base titration is determined using glass electrode.
3. Fluoride ion electrode interferes by OH^- at high pH values.
4. During coulometric titration of Fe^{2+} against cerium, Ce^{3+} is the mediator.
5. Mass transfer due to convection can be eliminated by preventing stirring process.

c. Sketch the diagram which represents: the cell used for polarographic measurement. (4 marks)

- d. The purity of a sample of picric acid, $\text{C}_6\text{H}_3\text{N}_3\text{O}_7$ (M.wt.=229 g/mole), is determined by controlled-potential coulometry, converting the picric acid to triaminophenol, $\text{C}_6\text{H}_9\text{N}_3\text{O}$. A 0.03 g sample of picric acid is placed in a 1000-mL volumetric flask and diluted to the volume. A 10-mL portion of this solution is transferred to a coulometric cell and diluted till the Pt cathode is immersed. The exhaustive electrolysis of the sample requires 1737 C of charge. Report the purity of the picric acid. (6 marks)**

Question 4: (20 marks)

a. Give the scientific name for each of the following statements: (5 marks)

1. It completes the electric circuit and its potential known and remains constant.
2. It contains a thin glass bulb at the bottom that is selective to H^+ ions.
3. It contains quantitative deposition of analyte as a solid on the cathode surface.
4. It can be removed by addition of **Triton X-100** to the polarographic cell.
5. The most widely used technique for quantitative analysis of redox reactions.

b. Mention two advantages for each of the following : (4 marks)

1. ISE's.
2. CCC.

c. Comment on the following: (5 marks)

1. The measured pH by glass electrode is higher than the actual pH in highly acidic solutions.
2. DME is not very useful for oxidation processes.

- d. Vitamin C, $\text{C}_6\text{H}_8\text{O}_6$ (M.wt.=176 g/mole), gives an anodic wave at +0.1 V vs SCE that can be used for analysis. 20 mL sample of orange juice stabilized with the addition of a small amount of oxalic acid is filtered, buffered to pH 8 and diluted to 50 mL. The anodic wave has I_d value of $9.36 \mu\text{A}$ with drop factor ($m^{2/3}t^{1/6}$) value of 2.6 and the diffusion current constant ($I_d/m^{2/3}t^{1/6}C$) equal 3. Calculate vitamin C concentration in ppm unit. (6 marks)**

Good luck: Dr. Yasmeeen Gaber and Dr. Hany Moustafa



Mansoura University
Faculty of Science
Zoology Department
Subject: Zoology 401

First Term
Fourth Level: Chemistry & Zoology
Date: 16-1-2016
Time Allowed: 2 hours

Courses (Comparative anatomy and origin of species)

Answer the following questions (Full marks 60)

Q1 - Fill in spaces with correct words (30 Marks)

- a- The methods of coelom formation are ----1----- and ----2-----
- b- In deep sea fishes the ---3----- gland modified to form----4----- which consists of upper portion named --5-- and bottom portion named ----6--- which coated by melanophores and ---7--- to ----8- light.
- c- The endochondral ossification centers are --9---, ---10---, ----11-- , ----12- and --13--
- d- The arch characteristic to mammalian skull only is --14--- which consists of ---15---, ---16-- and ---17--.
- e- The ear ossicles of the middle ear composed of --18---, ---19-- and --20- which derived from --21--, ----22-- -and --23--- respectively and characteristic to class -24-- only.
- f- The stomach of birds composed of -25---- and --26-- while in ruminants it composed of --27---, --28---, ---29-- and --30---

Q2- Choose the correct answer:

(10 marks)

- 1- Reduced coelom cavity found in -----
 - a- nematods & arthropoda.
 - b- annelida.
 - c- arthropoda only.
 - d- nematode only.
- 2- Otic bones presented only by periotic in class-----
 - a- amphibian.
 - b- aves.
 - c- reptelia .
 - d- mammals.
- 3- The secondary palate of crocodile is -----
 - a- floor of neurocranium.
 - b- totally fleshy.
 - c- anterior hard & posterior fleshy.
 - d- totally bone.
- 4- Double circulation characteristic to -----

a-mammals only.

b- all hot blooded animals.

c- all tetrapods.

d- all amniotes.

5- According to the cusps form, the herbivorous mammals have not the following shape -----

a-selenodont.

b- lophodont.

c- secodont.

d- lophodont & selenodont.

6- The provertebra appeared in -----

a-cephalochordata.

b- bony fishes only.

c- cyclostomata & aves .

d- cyclostomata only.

7-The whole body skin devoid of exoskeleton in -----

a-cephalchordata only .

b- cyclostomata only.

c- cephalchordata & cyclostomata.

d- all aquatic animals.

8-Jaw suspension in the amphistylic type occurred by -----

a-ligaments only .

b-hyomandibular only.

c- hyomandibular & 2 processes.

d- 4 processes from upper jaw itself.

9- Pleuro protineal cavity present in-----

a-mammals only .

b-amphibia only.

c- birds & amphibia.

d-reptilia only.

10- Hooves are characteristic to -----

a-primates only .

b-ungulates only.

c- primates & ungulates.

d-all mammals.

Q3 – Draw with complete labeling the following items (20 marks)

a- The different types of reptelian skull.

b- Phylogeny of the heart chambers among different tetrapoda.

c- Different shapes of the articulating surfaces of vertebrae.

d- The respiratory system of both cyclostomes and cartilaginous fishes.

(With best wishes Dr: Fawkeja Elsayad)

Mansoura University
Faculty of Science
Chemistry Department
Subject: Chemistry
Course(s): Surface Chemistry and
Molecular Spectroscopy
Code: Chem. 445



First term
4th year level Chemistry-Zoology
& Chemistry-Botany Students
Date: 23 January 2015
Time allowed: 3 hours
Full mark: 60 marks

Answer the following questions:

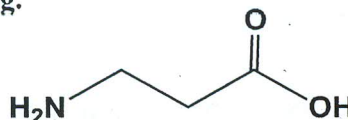
Section A: Molecular Spectroscopy

Q1: Complete the following: [12 Marks]

1. The energy of light is directly proportional to
2. Atomic absorption is, while atomic emission is
3. The wave lengths of lines in the hydrogen emission spectrum is given by.....
4. The total energy of molecule can have is equal
5. The intensities of spectra line in rotational spectrum are directly proportional to
6. The molecules are infra-red active they must have....., while the molecules are Raman active they must have
7. Chromophore is and the auxochrome is
8. The possible electronic transition for organic compounds are.....
9. The number of vibration for linear molecules are.....and non-linear molecules are.....
10. The vibrational spectra are accompanied bywhile the electronic spectra by
11. When molecule absorbs infra-red radiation the molecule is.....and when molecule absorbs microwave radiation the molecule is.....
12. The molecule contains a double bond has force constantthan the molecule contains a single bond

Q2: Explain the following: [10 Marks]

1. The difference between IR and Raman spectra.
2. Rayleigh, Stokes and anti-Stokes scattering.
3. The modes of vibration of CO₂ and H₂O
4. Rigid rotator
5. The electronic transitions for β-alanine:



Q3: Calculate the following: [8 Marks]

1. Calculate the energy per mole associated with ultra-violet region of electromagnetic spectrum assuming that the wave length is 5×10^{-6} cm.
2. Calculate the bond length for C¹²O¹⁶ molecule knowing that moment of inertia is 6.2×10^{-49} kg m².

Section B

Answer **five** questions **only** of the following,
[6 marks for each question= 30 marks]

- 1) **Define** the following terms with aid of diagrams:
 - i. Interface
 - ii. Adhesion forces
 - iii. Critical temperature
 - iv. Wetting agents
 - v. contact angle
 - vi. Capillarity
- 2) **Determine** the spreading coefficient of n-hexadecane ($\gamma_{O1A}=30.0$; $\gamma_{O1W}= 52.1$), n-octane ($\gamma_{O2A} = 21.8$ $\gamma_{O2W}=50.8$), and n-octanol ($\gamma_{O3A} =27.5$; $\gamma_{O3W}=8.5$) on water ($\gamma_{WA} =72.8$) at 20°C. (**Comment,,,**)
- 3) **Describe** the differences between physical adsorption and chemical adsorption.
- 4) **Deduce** the set equations of Langmiur model for describing the solid/gas adsorption.
- 5) **Deduce and discuss** the Kelvin Equation.
- 6) In the Du Nouy tensiometer, if the diameter of the ring is 1.0 cm and the force needed to pull the ring up (with the liquid attached to the outer and inner periphery of the ring) is 6.77 mN, **what** is the surface tension of the liquid?
- 7) **Calculate** the surface excess concentration for a 1 M aqueous solution of NH_4NO_3 . The rate of change the surface tension with concentration equal unity. ($R = 8.314 \text{ J/mol.K.}$)
- 8) **Discuss** the effect of temperature on surface tension of different liquids.

Best Wishes;

**Prof. Essam Arafa,
Dr. Hamdy Farag,**

**Prof. Salem Samra,
Dr. Kamal Shalabi**



Mansoura University Educational year: First Term
Faculty of Science Year: Fourth Year
Zoology Department Date: 26/1/2016
Program: Chemistry & Zoology Time Allowed: 2hrs
Subject: Z 403 Full Mark: 60 Marks
Course(s): Experimental Embryology Final Exam

Attempt all the following questions 30 Marks

Q.I: Part 1)- MCQs: 5 Marks

(A) Please select the **single best answer** for each of the following questions:

1- Sertoli cells serve a number of functions during spermatogenesis?

a. Secrete progesterone b. Secrete testosterone c. b & d d.

Phagocytosis

2-All of the following are requirements for cell to grow *in vitro*

EXCEPT:

a-Temperature at 37°C b.Humidity c.Growth medium d.

Selenium

3-Advantages of embryonic stem cells are the following EXCEPT

a.Flexible b. Immortal c.Hard to culture d.Can be divided

many times

4-Which type of cloning involves separating cells from the same embryo to produce multiple offspring?

a.Natural cloning b.Fusion cell cloning c. Embryo transplants

d.Genetic cloning

5-Classification based on level of stem cell differentiation

a.Totipotent b.Megapotent c.Protopotent d. Non

of them

Part II: True & False questions 5 Marks

1- Primary cultures derived from normal animal tissue. **True or False**

2- Alzheimer's disease and can cloning help? **True or False**

3-The causes of artificial insemination are the abnormalities preventing deposition of sperm close to the cervix

True or False

4-In genetic cloning, viral vector carrying healthy gene and inserts into cell and then new gene appear in the cell

True or False

5-Embryonic Stem Cells are never derived from eggs fertilized inside of a woman's body.

True or False

Q.II: A) Fill in the spaces **5 Marks**

1- Characteristics of continuous cell lines 1,-----2,-----3,-----

2-Features of stem cells are 1,-----2,-----3,-----

3-In vitro fertilization and embryo transfer can be management infertility of couples suffering from 1,-----2,-----3,-----

4-The basic principle of cloning 1,-----2,-----3,-----

5-Indications of intrauterine insemination are 1,-----2,-----3,-----

6- Cell & tissue culture playing major role for 1,-----2,-----3,-----

7-Sources of embryonic stem cells are 1,-----2,-----

Q.II: B) Short Answer **15 Marks**

(1) Discuss Three only from the following:

1-Applications of Animal Cloning

2-How stem cells can cure baldness & diabetes

3-Micro fertilization of human egg

4-Main types of cell culture according to the cell morphology

5-Types of stem cells according to the donors?

Part II: **30 Marks**

Q1. Write short accounts of five of the followings **20 Marks:**

1. Regeneration of tail and lens of amphibian.
2. Cell mediated immunity.
3. How to construct fate maps of mammals.
4. Renal and central nervous abnormalities .
5. Numerical & structural chromosomal abnormalities.
6. Limb abnormalities.

Q2. What do mean by only five of the following terms and their basis

10 marks : Antigen-antibody reaction, Spina bifida occulata, gonadal dysgenesis, Cranioschisis, Lobster claw, Club foot.

Best Luck

Prof.Dr. Hassan El-Sayyad

Prof. Dr. Amoura Abou-El-Naga