



Answer the following questions:

I- Choose only one answer for each of the following questions: (20 Marks)

1. The variable affecting on the eigen value of wave function for a particle in box is:
i-time ii- position iii- time and position iv- None of them
2. The probability density of negative charge cloud at a node equals:
i-constant ii- imaginary value iii- zero iv- all of them
3. The difference between time-dependent and time-independent Schrödinger equations:
i- Hamiltonian operator ii- Eigen function iii- kinetic energy iv- Non of them
- 4- A wave function affected by kinetic and potential energies is:
i-Eigen function ii- characteristic iii- acceptable iv- All
- 5- Wave function for any system depends on:
i-coordinate X ii- coordinate Y iii- coordinate Z iv- all
- 6- For a particle in box, increasing quantum number n:
i- increasing energy ii- increasing reactivity iii- increasing energy difference iv-All
- 7-The Hamiltonian operator is:
i-square of $\Psi(t)$ ii-square of $\Psi(x)$ iii- square of $\Psi(x,t)$ iv-none of them
- 8- π -overlap is weaker than σ -overlap because of:
i-face to face ii- stronger bond iii- lower energy iv- higher energy
- 9- Noble gas will not exist as a molecule because:
i-bonding and antibonding orbitals are occupied ii-No overlap iii-bond order=0 iv- All
- 10- Eigen value of Harmonic Oscillator depends on:
i-Frequency ii-Mass iii- Length iv-None of them
- 11- Number of overlaps depends on:
i-Number of bonds ii- Order of bond iii- Types of overlap iv- Types of bonds
- 12- The spherical polar function depends on:
i- Radial function ii- Angular Θ function iii- Angular ϕ function iv- All
- 13- Atomic wave function (d-) has quantum numbers:
i- 2,1,0 ii-3,1,1 iii- 1,0,0 iv-3,2,1
- 14- Number of bonds for N_2 molecule equals:
i-One ii- Two iii- Three iv- None of them
- 15- Cartesian coordinates describe the function with:
i-polar shape ii- circular shape iii- radius shape iv- None of them
- 16- 3d orbital has higher energy than 4s orbital because of:
i- Principle number ii- Magnetic quantum number iii- Shape of charge iv- All
- 17- The postulates of molecular orbital theory are:
i- Atomic orbital ii- Molecular orbital iii- Number of overlaps iv- All
- 18- Any wave function should be solved:
i-Mathematically ii- Experimentally iii- Virtually iv- None of them
- 19- Type of overlap is affected by:
i-Symmetry ii-orientation iii- bond order iv-all

20- Quantum chemistry is a branch of:

- i-Quantum physics ii- quantum dot iii- quantum computing iv- None of them

II- Calculate each of the followings: (10 Marks)

- a- Eigen value of a particle of mass (m) in the first energy level of one-dimensional box with walls $x= +2$.
- b- Eigen function of a particle in the y-direction box in second energy state with walls $y=L$.
- c- The potential energy of a particle inside one-dimensional box with walls with $x= +a$ and $x= -a$.
- d- The bond order of the formed molecule from atoms with atomic number =3.
- e- The number of molecular wave function for the anion H_2^{+1} .

III-1- The formation of molecular wave function is explained by molecular orbital theory, Draw the correlation diagram for F_2 molecule showing the atomic and molecular orbitals and the type of overlap for each molecular orbital.

(At. Number, C=6, N=7, O=8 and F=9) (10 Marks)

- 2- How many overlaps in a F_2 molecule? (2 Mark)
- 3- Calculate the bond order of N_2 molecule. (2Mark)
- 4- Explain the bond in H_2 molecule? (2 Mark)
- 5- What type of bond in C_2 molecule? (2 Mark)
- 6- Differentiate between bonding overlap in O_2 and Be_2 . (2 Mark)

Good Luck

Prof. Dr. Mohamed K. Awad

Prof.Dr. Faten M. Atlam



Answer the following questions: Questions I and II in Bubble Sheet

Question I: Multiple Choice

(25 Marks)

- Which of the following is not an iron ore?
a. Magnetite b. Hematite c. Pyrohotite d. Siderite
- The most stable oxidation state for Co is, but is an oxidizing agent
a. +2, +3 b. +2, +4 c. +3, +2 d. +4, +2
- Which one has not a strong magnetic properties?
a. Iron b. Nickel c. Silver d. Cobalt
- H₂O rusts..... but doesn't react with.....,
a. Fe, Ru, Os b. Ru, Os, Fe c. Os, Fe, Ru d. None of these
- One of the 3d elements form XCl and XCl₂....
a. Zn b. Fe c. Cu d. Ni
- forms square planer complexes while forms octahedral complexes.
a. Pt(II), Pt(IV) b. Pt(IV), Pt(II) c. Pd(II), Pd(III) d. Pd(IV), Pd(II)
- OsO₄ formed when Os react with O₂ and
- Which mineral group provides most of the world's economic iron (Fe) for steel production?
a. Silicates b. Sulfides c. Carbonates d. Oxides
- 2Cu⁺ → Cu²⁺ + Cu⁰ This is an example of
a. comproportionation b. disproportionation c. synproportionation d. proportionation
- Which metal is the most widely used (accounts for 95% of total metal production in world)?
a. Iron b. Nickel c. Gold d. Silver
- Which of these metals will be oxidized by the ions of cobalt?
a. Tin b. Nickel c. Silver d. Iron
- Ferrous metals have similarity like lanthanides.
a. horizontal b. vertically c. diagonal d. groupal
- Which of the following transition ions show **3d³** electronic configuration? (Atomic number of: V = 23, Cr = 24, Mn = 25, Fe = 26)
a. V²⁺, Cr³⁺, Mn⁴⁺, Fe⁵⁺ b. V⁴⁺, Cr⁶⁺, Mn⁷⁺, Fe²⁺ c. V³⁺, Cr³⁺, Mn³⁺, Fe³⁺ d. V³⁺, Cr⁴⁺, Mn⁵⁺, Fe⁴⁺
- Cobalt is passive towards
- a. dil. HCl b. aqua regia c. dil. HNO₃ d. dil. H₂SO₄
- Iron rusts slowly with water forming at red heat.
a. Fe(OH)₃ b. Fe₂O₃ c. FeO.OH d. Fe₃O₄
- Pure iron is
- a. soft and quite reactive b. highly reactive c. hard and reactive d. white and hard
- Iron is:
a. More reactive than lead c. More reactive than Calcium
b. Less reactive than copper d. Less reactive than mercury
- Iron (IV) sulfide is produced when Fe reacts with
- a. the exact amount of S b. less sulfur c. excess sulfur d. sulfur dioxide
- The state of cobalt can be determined from the color of the metal.
a. oxidation b. reduction c. solid d. liquid

- 20 is used as a catalyst, but..... is used as an electroplated
 a. Pt & Pd b. Pt & Ni c. Ni & Pt d. Ni & Pd
- 21 The role of limestone in the extraction of iron from its oxides is
 a. make Fe complexes b. increase the temperature c. reduce slag d. remove silicates
- 22 Which of the following statements about the given reaction are correct? $3\text{Fe}_{(s)} + 4\text{H}_2\text{O}_{(g)} \rightarrow \text{Fe}_3\text{O}_{4(s)} + 4\text{H}_{2(g)}$
 (i) Iron metal is getting oxidized (ii) Water is getting reduced (iii) Water is acting as a reducing agent
 (iv) Water is acting as an oxidizing agent
 a. (i), (ii) and (iii) b. (iii) and (iv) c. (i), (ii) and (iv) d. (ii) and (iv)
- 23 Which ore contains both iron and copper?
 a. Cuprite b. Malachite c. Chalcocite d. Chalcopyrite
- 24 Galvanized iron sheets have a coating of
 a. aluminum b. tin c. zinc d. copper
- 25 Cobalt is the active center of a group of coenzymes called.....
 a. cobaltimin b. cobalamin c. cobalimin d. cobaltase


Question II: State whether the following statements are True or False. (10 Marks)

- A ligand is a molecule or ion that is ionically bonded to the central metal ion.
- An oxidation number is a specific number of molecules or ions with which a transition metal will combine.
- Fe_3O_4 is a mixture of FeO and Fe_2O_3 .
- It is difficult to extract gold from its complexes.
- Cobalt has the ability to react with water at room temperature but doesn't react with most acids.
- Silver is rarely found in the +1 oxidation state
- The alloy of copper and zinc is known as Brass
- Nickle carbonyl is considered to be highly toxic.
- Cu is silvery white and not attacked by air at room temperature
- Nichrome is an alloy of nickel and chromium with small amounts of carbon.

Question III: Answer each of the following: (15 Marks)

- Why is copper a good conductor of electricity but not an electrolyte?
- Why is gold not affected by the addition of acids?
- What are the uses of gold nanoparticles when they are colored other than yellow?
- What happens when osmium reacts with oxygen?
- Give examples of Cu, Au, and Ag complexes.

BEST WISHES

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY			
	Final Examination of for third year students (All Double Major)			
COURSE TITLE:	Physical Organic Chemistry		COURSE CODE: CH3151	
DATE:	3/1/2023	TERM: FIRST	TOTAL ASSESSMENT MARKS: 50	TIME ALLOWED: 2 HOURS

Answer the following questions: (50 marks)

1] Choose the correct answer from the alternatives a,b,c and d. (10 marks)

1) The sign of ρ in the ionization of m-and p-substituted phenyl acetic acid is

- a) +ve b) neither c) +ve & -ve d) -ve

2) The rate of saponification of p- amino ethylbenzoate is.....

- a) 1.0 b) <1.0 c) zero d) >1.0

3) The rate of alkylation of p-methoxy N-methyl aniline is

- a) <1.0 b) >1.0 c) zero d) 1.0

4) Reaction that facilitated by electron with donating groups will have the value of ρ

- a) +ve b) -ve c) +ve & -ve d) neither

5) ρ value for standard ionization reaction of benzoic acid in water at 25 °C

- a) <1.0 b) zero c) >1.0 d) 1.0

6) The sign of ρ in ionization of p-cyano-phenol in H₂O at 25 °C is

- a) -ve b) neither c) +ve & -ve d) +ve

7) Which of the following substituents increase the rate of alkylation of phenoxide ion

- a) p-OCH₃ b) m- NO₂ c) p-NO₂ d) m-OCH₃

8) Insertion of single carbene with propane gave

- a) n-Butane b) 2-methyl propane c) 1-Butene d) Both a and b

9) Hammett substituent constant (σ) is a measure of

- a) The electronic effect exerted by a substituent on the reaction center.
b) The sensitivity of a reaction to the electronic effect of a substituent.
c) The sensitivity of a reaction to the steric effect of a substituent. d) None of the above

10) Free radical with $t_{1/2} < 10^{-3}$ second are:

- a) Stable radical b) Stabilized & Destabilized radicals c) Persistent radicals d) Both a and c

2] Explain by equation: σ_{p-OMe} substituent in base catalyzed hydrolysis of ethyl benzoate is (-ve) sign while σ_{m-OMe} in the same hydrolysis is (+ve) sign. . (4 points)



3] Put (✓) or (x) and correct the wrong answer (Explain by answers): (16 marks)

- a) The sign of ρ in the solvolysis of benzylchloride in acetone is +ve value.
- b) The rate of base initiated hydrolysis of p-hydroxy ethylbenzoate is more than unity.
- c) Addition of phenyl radical to *tert*-butyl benzene gave 2-phenyl-*tert*-butyl benzene as a major product.
- d) For a reaction in which there is no free energy change ΔG° , all starting materials converted into products.
- e) Increasing the temperature and using polar solvent increase the value of ρ .
- f) The constant, (σ) in Hammett equation with (+ve) sign indicates that the substituent is an electron withdrawing group.
- g) CH_3COOEt is more acidic than CH_3COCH_3 .
- h) $\text{S}_\text{N}1$ solvolysis of 3-chloro-1-butene in ethyl alcohol form one product of ether

4] Provide the product of the following reactions. (6 points)

- a) Triplet carbene + $\text{CH}_3\text{-CH}_3 \rightarrow$
- b) $\text{H}_2\text{O}_2 + \text{Fe}^{+2} \rightarrow$
- c) $\cdot\text{CH}_3 + \text{CH}_2=\text{CHCOOH} \rightarrow$

5] How could you prepare: (8 points)



- a) Ethyl radical from Ag^+ , methyl radical from H_2O
- b) Benzoic acid from benzaldehyde
- c) Cis 1,2-dimethyl cyclopropane from ketene

6] Arrange the following radicals according to their stability (Explain and draw structure) (6 points)

- a) Methyl radical
- b) DPPH
- c) Isopropyl radical
- d) Allylic radical

Good Luck

Prof. Dr. Mahmmoud Taha & Ass. Prof. Dr. Sahar El-khalafy

	<p style="text-align: center;">Tanta University Faculty of Science Chemistry Department</p>		
Final Examination for The Third Double Major (CH-BO, CHMB , CH-GE, BC)			
Course Title	Heterocyclic Chemistry		Course Code CH3153
Date 27/12/2022	First Term	Total assessment:100	Time allowed 2hrs

1-Answer by equations the following questions. (34 Marks)

- a- Synthesis of 3-Methyl-2-Phenyl Pyrrole using Vilsmeier reaction.
- b- o-Nitrotoluene to Indole-2-Carboxylic acid.
- c- Using Skraup synthesis how you prepare 4- Methylquinoline.
- d- 2-Phenylethylamine to 1-Methylisoquinoline.


2- Explain by mechanism the following. (33 Marks)

- a- Aldopentose to 3- Nitrofurane.
- b- Hoffman exhaustive methylation of TetrahydroPyrrole.
- c- Indole to Tryptophan.
- d- Discuss by examples the reactivity of different types of Picoline.

3- Answer the following questions. (33 Marks)

- a- Draw the resonating structure of Pyrrole.
- b- Reduction and oxidation of Pyridine.
- c- Show by mechanism the ring opening of Quinoline.
- d- Trimerization of Thiophene.

Prof.Dr. Mahmoud Fahmy

 1969	Tanta University - Faculty of Science Department of Zoology		
	Examination for the third level (juniors) students Chemistry/Zoology program		
	Invertebrates of Egypt		Course code: Zo 3143
Date: 15 Jan. 2023	Term: first	Total assessment marks: 150	Time allowed: 2 hours

First question :.....(35 marks).

A) Write on the following :.....(10marks).

- 1- Main taxonomic characters to classify Animal kingdom.
- 2- Diagnostic feature of phylum: Porifera.

B) Complete the empty spaces by correct answers :(15marks).

- 1- In pelagic province, the biozones which extend to 200 m. are called and while in benthic is called
- 2- Larva of demospongia is called and its development is characterized by
- 3- Monaxonida can be classified into 3 orders called, and
- 4- In Woese system, the living organisms are included in three domains called,, and which contains four kingdoms called,, and

C) 1- By only full-labeled drawings show the following:(6 marks).

Reduction bodies – Gemmule – Amphiblastula larva.

- 2- Classify marine environment according to amount of light.....(4marks).

Second question :.....(40 marks).

I) In a table compare between the following couples(6 marks, 3 each):

a. Calyptoblastea and Gymnoblastea

b. Discomedusa and Rhizostomea.

II) Mention the scientific terms (14 marks, 2 each):

- a. Skin fold the found on the periphery of the medusa and has a taxonomic function and increase velocity of the organisms ()
- b. Production and emission of light in some marine organisms that is famous in scyphomedusa ().

- c. Many mouths found on arms of rhizostomea ().
- d. Sense organs specialized in scyphomedusa ().
- e. The perisarc that covered the hydranth in calyptoblastea ().
- f. A medusoid form that has a function of floating ().
- g. An expression that means a variations in zooids in the life cycle ().

III) Complete the following with suitable words (20 marks, 1 each):

- a. Phylum cnidarian includes four classes. All are represented in Egyptian fauna except class----
- b. The migration of marine organisms from Mediterranean to Red Sea called-----migration.
- c. Life cycle of *Obelia dichotoma* has two forms of larva called....., andlarva, while *Tubularia Larynx* life cycle has-----, and -----larva.
- d. The entron cavity of any hydroid in class hydrozoa have no----- nor -----, so it is primitive.
- e. The craspedot medusa isand represented in class Hydrozoa
- f. *Obelia dichotoma* hashydrotheca, while *O. geniculate* hashydrotheca. Their habitat inand discovered by
- g. The sessile schyphomedusa has a shape of, the exumbrella is modified to beand the subumbrella is modified to be
- h. The mauve stinger is characterized by purple color and belongs to family,that characterized bywater canals. Its habitat in.....that discovered by

Third question :..... (35 Marks).

- 1- Mention two differences between *Syllis* sp., *Cirratulus* sp., *Polydora* sp., and *Aphrodite* sp. (10 Marks).
- 2- Describe *Mixicola* sp. and *Dasychon* with drawing a diagram for each one. (10 Marks)
- 3- Mention the general characters of Phylum Rotifera and their affinities to Arthropods and Annelids. (15 Marks)

Fourth Question :..... (40 Marks).

A- Write shortly on the specific characters of: (10 Marks, 5 Marks each):

- 1- Class Pycnogonida 2- Super order Phyllocarida

B- Complete the following: (18 Marks, 2 Marks each) :

- 1- All theoeacic appendages in Sub order Gammaridea are, specially 2nd appendage is
- 2- The specific character of *Corophium* sp. is
- 3- *Melita* sp. is characterized by abdomen.
- 4- In *Xiphosuridians*, body is divided into and, with eyes and carry pairs of walking legs, then the body ends with


C- Put True (✓) or False (X) and correct the wrong sentences: (12 Marks, 2 Marks each) :

- 1- Amphipods have transparent carapace cover all the body.
- 2- Pleon in Family Sphaeromatidae composed of 2-4 segments while, in Cirolanidae composed of 6 segments.
- 3- Gills present on thoracic segments in Isopods while, on abdominal segments in Amphipods.
- 4- Tail fan is well developed in Sub order Valvifera, but absent in Flabellifera.
- 5- *Nebalia* sp. has carapace covered head, thorax and 2 abdominal segments.
- 6- Eucaridean animals never carry oostegite.

With best wishes

Examiners: Prof.SamiaEissaProf.NahlaOmran

Prof.Wesam Salama Dr.AalaaAtlam

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF ZOOLOGY		
	EXAMINATION FOR SENIORS (THIRD YEAR) STUDENTS OF CHEMISTRY AND ZOOLOGY		
COURSE TITLE:	Functional Histology		COURSE CODE: Z0 3145
DATE:	1 /1/ 2023	TERM: FIRST	TOTAL ASSESSMENT MARKS:100 TIME ALLOWED: 2 HOURS

A- Answer the following questions (with draw if possible). (20 Marks)

- 1- Write the main histological alterations among esophagus, stomach and ileum?
- 2- Discuss briefly why liver and pancreas are considered a mixed gland?

B-Compare between the following: (30 marks)

- 1- Thick skin and thin skin.
- 2- Olfactory mucosa and respiratory mucosa.
- 3- Upper esophagus and lower esophagus.

C- Complete the following: (20 Marks)

- 1- The apocrine sweat glands are characterized by
- 2- Gastric mucosa are composed of different types of cells like.....which functions are
- 3- The skin epidermis consists of the following cells..... Which exhibit the following functionsrespectively
- 4- The mucosa of the dorsal surface of the tongue is modified to form four types of papillae called
- 5- The small intestine is composed of The mucosa of the small intestine presents folds, known as Which appeared like.....in duodenum andin the ileum.
- 6- The thick skin differs from the thin skin in the absence of
- 7- The sub mucosa of the duodenum contains numerous glands are called which function are
- 8- The conducting portion of the respiratory system consists of While the respiratory portion consists of
- 9- The wall of the alveoli is composed of two type of cellsandwhich functions areandrespectively.
- 10-is the largest organ of the body which is composed of the skin and its derivatives like.....

D- Choose the correct answer (s) and write them in the answer sheet: (10 Marks)

- 1- The merocrine sweat glands are characterized by:
a- Secreting a watery product containing solutes b- containing clear and dark cells
c- having no myoepithelial cells d- being simple coiled tubular merocrine gland
- 2- Which of the following are functions of skin keratinocytes:
a- Produce keratin b- produce interleukin
c- Produce immunogenic molecules d- produce interferons and tumor necrosis factors
- 3- Which of the following are functions of sebaceous glands
b- Help to keep the skin and hair soft b- help to protect epidermis from water penetration
c- They secrete the antibacterial substances d- they form keratin filaments
- 4- Cells of the basal stratum of epidermis include:
a- Melanocytes b- Highly divided columnar cells
b- Merkel's cells d- Langerhan's cells
- 5- Alveolar type II cells are :
a- Cuboidal cells that secrete surfactant b- squamous cells involved in gas exchange
c- Ciliated cells that move mucous d- columnar cells that secrete mucous

E- Draw (3) three from the following: (20 marks)

- 1- The structural and the functional units of the liver
- 2- T.S of trachea of mammal
- 3- V.s of thick skin
- 4- T.S of duodenum
- 5- T.S of lower esophagus

Good luck

EXAMINERS	PROF. DR. AHMED MASSOUD
	DR. MONA ELWAN