

Final Exam: Inorganic Chemistry 4<sup>th</sup> level (C-422)

Answer the following questions:

الامتحان من ثلاث صفحات

Question Number One:

( 30 marks )

Put right ( ☒ ) or wrong ( X ) in front of the following:

- 1- Organometallic compounds are those in which the carbon atom of organic group is bound indirectly to metal atom (      ).
- 2-  $(C_3H_7O)_4Ti$  is considered to be an organometallic compound and  $C_6H_5Ti(C_3H_7O)_3$  is not considered to be an organometallic compound (      ).
- 3- The organo compounds of low electro positive metals are usually ionic and those of high electro positivity form  $\sigma$  bonded organometallic compounds (      ).
- 4- Oxidative addition reactions and insertion reactions are utilized to generate metal – carbon bond (      ).
- 5-  $Cr(CO)_6$  and  $Ni(PF_3)_4$  are complex ions (      ).
- 6-  $[Mn(CNR)_6]^+$  and  $[Fe(CN)_5CO]^{-3}$  are binary molecular compounds (      ).
- 7-The  $\pi$  acid ligands can stabilize metals in low oxidation state and form stable complex (      ).
- 8-The effective atomic number rule is applied to all complexes without exceptions (      ).
- 9- $Fe(CO)_5$  and  $Ni(CO)_4$  are poly nuclear metal carbonyls (      ).
- 10- $Fe_3(CO)_{12}$  is heteronuclear compound while  $MnRe(CO)_{10}$  is homonuclear carbonyl compound (      ).
- 11- The double bridging types occur fairly frequently and always in conjunction with an M-M bond (      ).
- 12- stability of bridged structure increased as the metal atom size increased (      ).
- 13-  $(OC)_5Mn-Mn(CO)_5$  have two bridged CO's while  $Fe_3(CO)_{12}$  has no CO's bridges (      ).
- 14-  $Co_2(CO)_8$  exists as an equilibrium mixture of bridged and non-bridged structure (      ).
- 15- The effects of  $\sigma$ - bond formation strengthen the  $\pi$ -bond and vice versa and known as synergic reaction (      ).

**Question Number Two.**

**(30 marks)**

Complete the following sentences with the correct choice (between brackets ).

- 1- The successive  $K_f$  (.....) due to decreased number of  $H_2O$  available for replacement ( increases- decreases ).
- 2- For determination of stability constants in solution.....independent concentration measurements are needed. ( n, 2n, n+2 )
- 3- If  $K_{f_{n+1}} < K_{f_n}$  some change has occurred in .....( ionic size –coordination No.)
- 4- Chelate complex formation results in (..... ) of the number of independent molecules. ( increase – decrease )
- 5- Chelate complexes are always more stable due to (.....) of  $\Delta S$  & kinetic effect. ( increase – decrease )
- 6- Metal complexes without extra stability are (.....). ( labile- inert ).
- 7- Very small ions are less labile, because of (.....) M-L bond and steric effects. (weak – strong)
- 8- 4d, 5d metal complexes are usually non-labile, because of (..... )LFSE. (small – large)
- 9- In (.....) reactions the rate shows a dependence on the entering group. (dissociative- associative)
- 10- The rate constant of square planar substitution reaction (.....) as the nucleophilicity of the entering group increases. (decreases – increases).
- 11- Complexes of  $d^{10}$  ions ( $Zn^{2+}$ ,  $Cd^{2+}$ ,  $Hg^{2+}$ ) are normally (.....). (inert – labile)
- 12- Across d series  $M^{3+}$  are distinctly (.....) labile than  $M^{2+}$ . (less – more)
- 13- Associative mechanism has a step where an intermediate is formed with a (.....) coordination number than the original complex.( higher – lower ).
- 14- Rate determining step is (.....)if rate strongly depends on the incoming ligand.( associative –dissociative ).
- 15- Soft Lewis base ligands have ..... proton affinity. ( very high – very small)

**Question Number Three.**

**( 30 marks)**

Put right (  $\checkmark$  ) or wrong ( X ) in front of the following:

- 1- A reaction may be thermodynamically possible, yet kinetically it is not reactive(      ).
- 2- If  $K_f$  is large, incoming L binds weaker than  $H_2O$  (solvent), (      ).
- 3- Irving-Williams order of stability constants depends on the type of ligand.(      ).
- 4- In ligand substitution reactions: one Lewis base displaces another. (      )
- 5-  $[Fe(bipy)_3]^{3+}$  is much more stable than  $[Fe(OH_2)_2(bipy)_2]^{3+}$ .(      ).
- 6- Metal complexes that react with  $t_{1/2} \leq 1$  min are kinetically inert. (      ).
- 7- No relationship between thermodynamic stability and lability towards substitution.(      ).
- 8-  $[Cr(H_2O)_6]^{3+}(d^3)$  undergoes substitution slowly, while  $[Fe(H_2O)_6]^{3+}(d^5)$  fast. (      ).
- 9- Complexes of M(III) f-block are all very labile. (      )
- 10- Nucleophilicity is rate of attack on a complex by a Lewis base relative to the rate of attack by a reference Lewis base. (      )
- 11- An interchange mechanism is a process in which there is no intermediate species with a coordination number different from that of the starting complex. (      ).
- 12- both  $k_1$  and  $k_2$  terms are dissociative in square planar substitution reactions.(      ).
- 13- The choice of the leaving group in a square planar complex is determined by the nature of the ligand trans to it. (      ).
- 14- Intermediates can be isolated or detected while transition states cannot be isolated.(      ).
- 15- The greater the overlap between metal and ligand orbitals the stronger is the trans effect.(      ).

Good Luck

Prof. Sahar El-Gyar, Prof. Said Ibrahim



Assiut University	Second Semester	July 2020
Faculty of Science	Instrumental Methods of Analysis	Time Allowed: 2 hours
Chemistry Department	C-445 (Credit Hours System)	

Please give only one clear mark in the table in response to each question

**Section (A): Final Examination (50 Marks, Time allowed: 75 min)**

**Answer the Following Questions:**

**Mark (✓) for the correct statement and (X) for the wrong statement:**

1. Supporting electrolyte is a reactive electrolyte used in electrochemical cells
2. The principle function of a potentiostat is to control potential and measure current
3. Hg forms soluble amalgam with many metals hence lowers their reduction potentials
4. Microelectrodes reach the state of polarization very rapidly
5. The presence of O<sub>2</sub> often interferes with the accurate determination of other species
6. Polarizable electrode such as DME can take up any potential applied to it
7. Hg is oxidized; it restricts the use of electrode as cathode
8. Auxiliary electrode does not enter in the redox reaction while it is so important in keeping a constant working electrode potential
9. The half wave potential ( $E_{1/2}$ ) can be used to identify the analyte concentration
10. Faradaic processes are those which involve the transfer of electrons across the electrode-solution-interface and do not obey Faraday's Law
11. Heyrovsky-Illkovic equation determines the number of electrons from the intercept
12. Working electrodes should possess a high signal-to-noise ratio characteristic
13. Eelectrochemical cell is made up of three electrodes immersed in a solution containing the analyte and also an excess of a nonreactive electrolyte
14. The potential of the working electrode versus a reference electrode is varied linearly with time



15. Carbon working electrodes have faster electron transfer rates than metal electrodes
16. Solvents used in voltammetry should not undergo electrochemical reactions over a wide range of potential
17. Supporting electrolyte should be in large excess of analyte concentration
18. The potentiostat's internal feedback circuits prevent current from flowing between the WE and RE
19. Surface area of polarizable electrode is very small
20. For reversible systems  $E_{pa}$  and  $E_{pc}$  are independent of the scan rate
21. Normal pulse is about 5-10 times more sensitive than differential pulse polarography
22. Current is sampled twice in normal pulse polarography
23. Current of polarizable electrode remains unchanged with changes in the electrode potential
24. Diffusion is the movement of ions from region of higher concentration to region of lower concentration
25. In polarography, a plot of current as a function of applied potential is called a voltammograms
26. In absorption spectroscopy, reflection is maintained minimum
27. In the visible absorbance spectrum, the vertical axis represents the absorbance values and the horizontal axis represents the electromagnetic radiation wavelength
28. A shift to lower wavenumber for certain absorption corresponds to a shift to lower energy
29. Infrared radiation has a longer wavenumber than visible light
30. The wavelength of a  $20000\text{ cm}^{-1}$  photon is 500 nm
31. A plot of absorbance against concentration of  $\text{KMnO}_4$  is linear with a negative gradient
32. At doubled concentration, the wavelength of the maximum absorption is different
33. Beer Lambert's law gives the relation between energy absorption and reflected radiation
34. The quantum transition that takes place in ultra-violet and visible spectroscopy is spin of nuclei in a magnetic field
35. X-ray is a type of spectroscopy

36. Emission spectroscopy occurs when a photon from an analyte moves to a higher-energy state
37. Ultraviolet-visible spectroscopy is an example of absorption spectroscopy
38. The absorbance of a sample that has a percent transmittance of 40 % is 0.398
39. Classical methods for analysis require more amount of sample than spectroscopic methods
40. Fluorescence spectroscopy is a type of absorption spectroscopy
41. The molar absorptivity of a compound equals to the compound's absorptivity  $\{(g/ml)^{-1}cm^{-1}\} \times M.wt.$
42. Sample recovery is possible after spectroscopic analysis
43. Molar absorptivity is the measure of the amount of light absorbed per unit volume
44. Deuterium and tungsten lamps are used as a light source in UV/Visible spectrophotometers
45. If both the product and titrant absorb at certain wavelength in a spectrophotometric titration, the end point at this wavelength is placed corresponding to the minimum absorbance
46. Emission following the absorption of a photon is called photoluminescence
47. The absorptivity of a sample is the same at all wavelengths
48. A precise analytical measurement will always have a small relative standard deviation
49. The frequency of a transition (speed of light =  $3 \times 10^8$  m/s) is  $1.2 \times 10^{15}$  Hz. The corresponding wavelength is 200 nm
50. Colored samples absorb within the visible region



**Section (B): Quiz (10 Marks, Time allowed: 15 min)**

**Mark (✓) for the correct statement and (X) for the wrong statement:**

1. Normal pulse polarography, consists of a series of pulses of increasing amplitude applied to successive drops
2. In anodic stripping methods, the WE behaves as a cathode during the deposition step
3. One important application of amperometry is in the construction of electrochemical biosensors
4. Various functional groups, such as C=O, N=N, and NO<sub>2</sub> are oxidized in the polarographic range
5. Peak current for a reversible couple is given by the Randles-Sevcik equation:  

$$I_d = 708 n C D^{1/2} m^{2/3} t^{1/6}$$
6. Electromagnetic radiation cannot travel through a vacuum
7. If the concentration of an unknown sample is higher than the highest concentration in the calibration range, the sample should be diluted
8. The ultraviolet-visible spectroscopy makes the light visible
9. Frequency of electromagnetic radiation is the number of waves per unit time
10. Pathlength in UV/Vis. spectroscopy is defined as the distance that the light travels through a sample in an analytical cell

**Section (C): Midterm Exam (10 Marks, Time allowed: 15 min)**

**Mark (✓) for the correct statement and (X) for the wrong statement:**

1. Mass transport defined as the rate at which the reactants and products are transported to and from the surface of the electrode
2. In sampled current Polarography, current measurement only over the last few ms of the drop life
3. Diffusion, migration and convection are three modes of mass transport to and from the electrode surface
4. Supporting electrolyte is used in polarography to minimize convection current
5. Reference electrodes should possess a high signal-to-noise ratio characteristic
6. When an emission results from an enzymatic reaction, this emission is called chemiluminescence



7. Transmittance is the ratio of the source radiation's power reflected from the sample to that incident on the sample
8. Absorption spectroscopy measures the attenuation of light when a molecule moves to the ground state
9. If only the titrant absorbs in a spectrophotometric titration, significant absorbance is not detected before reaching the end point
10. The spectrophotometric titration curve represents a relationship between the corrected absorbance and the volume of the analyte

**Section (D): Oral Exam (10 Marks, Time allowed: 15 min)**

**Choose the Correct Answer:**

1. The diffusion current in polarography is expressed by .....  
 (a) Randles-Sevcik equation      (b) Ilkovic equation      (c) Boltzmann equation
2. The potential of the working electrode versus a reference electrode is varied linearly with .....  
 (a) Time      (b) Current      (c) Scan rate
3. Current is sampled twice in .....  
 (a) Normal pulse      (b) Cyclic voltammetry      (c) Differential pulse polarography
4. Convection current in polarography is eliminated by.....  
 (a) Addition of KCl      (b) Unstirred solution      (c) Supporting electrolyte
5. In polarography, the electroactive species will undergo .....  
 (a) Always oxidation      (b) Always reduction      (c) Either oxidation or reduction
6. One part per million is the same as.....  
 (a) 1 mg/g      (b) 1 ng/kg      (c) 1 µg/g      (d) 1 µg/kg
7. An important advantage of a double-beam spectrophotometer over a single-beam spectrophotometer is that  
 (a) it permits cancellation of slow variations of the source power  
 (b) it requires same light source for UV, Vis and Infra-red radiation  
 (c) it can be used in conjunction with rapid response detection systems  
 (d) a greater range of wavelengths can be used
8. An aqueous solution of a Ni(II) salt (0.050 mol/L) shows three absorbance values, one of which has a value of  $\epsilon = 2.95 \text{ M}^{-1}\text{cm}^{-1}$ . What is the corresponding absorbance, if the pathlength of the solution cell used for the measurement is 2.00 cm?  
 (a) 0.221      (b) 148      (c) 0.295      (d) 0.0295

9. Three colored glass plates of equal thickness are placed in a light beam. Each sheet absorbs one quarter of the light incident upon it. The intensity of the light transmitted by the third glass plate is .....
- (a) 1.56                      (b) 42.19                      (c) 56.25                      (d) 75.00
10. A solution containing 10.00 ppm of "B" had an absorbance of 0.154 in a 1.00 cm cell at 690 nm. If 5.00 mL of this solution was diluted with water to 50.0 mL, the absorbance of the new solution at 690 nm is.....
- (a) 0.077                      (b) 0.0385                      (c) 0.0154                      (d) 0.0077

ANSWER SHEET

<i>Answer for Section (A): Final Examination (50 Marks)</i>														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	<i>Marks (25)</i>				
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	<i>Marks (25)</i>				

<i>Answer for Section (B): Quiz</i>										<i>(10 Marks)</i>
1	2	3	4	5	6	7	8	9	10	

<i>Answer for Section (C): Midterm Exam</i>										<i>(10 Marks)</i>
1	2	3	4	5	6	7	8	9	10	

<i>Answer for Section (D): Oral Exam</i>										<i>(10 Marks)</i>
1	2	3	4	5	6	7	8	9	10	

**Good Luck**

*Examiners: Dr. Hossieny Ibrahim & Ahmed Baume*



Assiut university Faculty of science Chemistry department	Final exam Time: 2 hours Unit process in fertilizer industry	Industrial chemistry Fourth level (400 Eng)
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### First question

(30 degrees)

**- True or false:**

- 1- The chemical reaction possible goes, when  $\Delta G$  is +ve.
- 2- The main factor, which control thermodynamically the chemical reaction, is temperature.
- 3- The main factor, which control the chemical reaction kinetically, is pressure.
- 4- The equilibrium constant changes with changing concentration.
- 5- The pressure of production  $\text{SO}_2$  is one atmosphere.
- 6- Oxidation of S to  $\text{SO}_2$  to  $\text{SO}_3$  is an exothermic reaction, but oxidation of  $\text{SO}_2$  to  $\text{SO}_3$  is an endothermic reaction.
- 7- Controlling the temperature for production  $\text{SO}_2$  done by excess air.
- 8- Energy, which generated by exothermic reaction decreases the moisture of the products.
- 9- Heat exchangers are saving the operation cost of producing  $\text{SO}_2$ .
- 10- Air is better than water in heat transfer.

### Second question

(30 degrees)

**Choice the correct answer**

- 1- The chemical reaction goes spontaneously, when  $\Delta G^\circ$  is (+ve, -ve, 0)
- 2- The chemical reaction equilibrium done, when  $\Delta G$  is (+ve, -ve, 0)
- 3- The best shape for heat transfer is (cylinder, flat, sphere)
- 4- The equilibrium constant changes with changing (concentration, temperature, pressure)
- 5- Excess air which needed for production  $\text{SO}_2$  (<1, >1, =1)
- 6- Turbulence ..... efficiency of heat transfer. (decreases, increases)
- 7- Activity of pure substances equal (<1, >1, 1)
- 8- Enthalpy of elements equal (0, 1, <0, >0)
- 9- The most factor consumes energy in industrial chemistry is (heating, freezing, lighting)

10- Recycling energy of gases done by (boilers, condensers, evaporators)

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**Third question**

**(30 degrees)**

**Complete the following**

- 1- Temperature of chemical reaction determined by ..... and/or .....
- 2- Reynold's number limit in heat transfer equal ..... in flat and ..... in cylindrical transfer.
- 3- Decreasing of moisture done by ..... or .....
- 4- Recycling of wastes is useful for ..... and .....
- 5- In industrial chemistry must control ..... and .....

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**Fourth question**

**(10 degrees)**

- Write the steps to design a chemical reactor to produce MAP.

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**Good Luck**

**Dr. Eng.\ Ahmed Dawood**



Assiut University  
Faculty of Science  
Chemistry Department

July, 2020  
Time: 3 hours  
Marks: 90

**Final Examination for 4<sup>th</sup> Level Students of  
"Selected Topics in Analytical Chemistry" (C-444)**

**Answer the following questions:**

**(90 Marks)**

**( I ) Put (✓) or (x) for the following:**

**(74 Marks)**

- 1- Solvent extraction is one of separation techniques. ( )
  - 2- Solvent extraction involves the distribution of a solute between two immiscible liquid phases. ( )
  - 3- For aqueous dilute solutions the ppm and mg/L units are the same. ( )
  - 4- Successive extraction is better than single extraction. ( )
  - 5- For the extraction of benzoic acid from aqueous solution into ether, the relation between D and  $K_D$  is ( )
- $$D = \frac{K_D}{1 + K_a/[H^+]_{aq.}}$$
- 6- In acid solution D is maximum. ( )
  - 7- In alkaline solution D is minimum. ( )
  - 8- The fraction of solute extracted is equal to the number of millimoles of solute in the organic phase divided by the total number of millimoles of solute. ( )
  - 9- The number of millimoles of solute in each phase is  $V_{mL} \times \text{Molarity}$ . ( )
  - 10- The percent extracted of a solute is the fraction of solute extracted divided by 100. ( )
  - 11- The amount extracted of a solute after n extractions is given by ( )

$$X_n = X_o \left( \frac{1}{1 + K_D \frac{V_{org.}}{V_{aq.}}} \right)^n$$

- 12- Surface water is more contaminated than ground water. ( )
- 13-  $Cl_2$  possesses a residual disinfecting activity. ( )
- 14- UV disinfection has no toxic residuals. ( )
- 15- UV disinfection is affected by pH and temperature changes. ( )
- 16- Condensation reaction is used for the determination of aromatic amine compounds. ( )
- 17- Condensation reaction is not used for the determination of hydrazine derivatives. ( )

أنظر خلفه باقي الأسئلة  
الاختبار النظري في ثلاث ورقات من (1-3)  
والاختبار الشفوي ورقة رقم (4)



- 18- Zinc dust is used as a reducing agent during determination of secnidazole drug. ( )
- 19-  $Ce^{+4}$  is used as a reducing agent for natulan. ( )
- 20- The condensating agent 4,5-dimethyl -o-phenylenediamine is used during the detection of ascorbic acid. ( )
- 21-  $HgCl_2$  is used as an oxidizing agent of vitamin C. ( )
- 22- Flumecinol can be determined by elimination and cleavage reaction. ( )
- 23- Glycine can not be formed by cleavage reaction of nitrazepam. ( )
- 24- The compound 2-amino-5-nitro benzophenone can not be prepared from nitrazepam. ( )
- 25- Dopamine can be determined using complexation with  $Ni^{+2}$  ions. ( )
- 26- Bromothymol blue is detected by ion pair formation. ( )
- 27- The compound 4-amino antipyrine can not be detected using enzymatic reaction. ( )
- 28- The  $\pi$  electrons form carbon-carbon and carbon-hetero atom double and triple bonds. ( )
- 29- Norfloxacin drug can not be determined using ion pair formation reaction. ( )
- 30- Arbutin can be detected by complexation with  $AlCl_3$ . ( )
- 31- The term "quenching" refers to many factors that increase fluorescence. ( )
- 32- Inner filter effect occurs in samples with very high absorbance. ( )
- 33- Fluorescence is not affected by changes in temperature. ( )
- 34- The conductance of the solution is a reciprocal of its resistance. ( )
- 35- Emitted light is always a shorter wavelength than the absorbed light. ( )
- 36- Equivalent conductance is the conductance of one gram of solute contained between electrodes spaced one centimeter apart. ( )
- 37- Very high concentrations can have very low fluorescence. ( )

**( II ) Choose the correct answer:**

**(16 Marks)**

- 1- Static quenching is an interaction of:
  - a) fluorophore with fluorophore.
  - b) fluorophore with quencher.
  - c) quencher with quencher
- 2- The linearity of a sample is related to:
  - a) chemical composition of the sample.
  - b) pathlength of the light.
  - c) concentration of the sample.
  - d) all of them.
- 3- The spectrofluorimetric method for the determination of paroxetine hydrochloride is based on:
  - a) oxidation by cerium (IV).
  - b) charge-transfer reaction.
  - c) formation of fluorescent complex.

أنظر خلفه باقي الأسئلة

- 4- In titration of strong acid with strong base, initial conductivity will be ..... upon addition of strong base.
- low and increase.
  - high and decrease.
  - high and increase.
  - not be affected.
- 5- Collisional quenching resulting in:
- increase of emission energy.
  - increase of excitation energy.
  - loss of excitation energy.
  - none of them.
- 6- If the interfering substance is reflective, the fluorescence intensity will:
- decrease.
  - increase.
  - not be affected
- 7- The luminescence intensity of the Eu-L<sub>1,3</sub> complexes was enhanced by the addition of:
- carbonate ions.
  - nitrate ions.
  - citrate ions.
  - chloride ions.
- 8- Conductometric titrations are not suitable for ..... reactions:
- neutralization.
  - complexation.
  - precipitation.
  - redox.

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**" Good Luck "**



Assiut University  
Faculty of Science  
Chemistry Department

July, 2020  
Marks: 10

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**Oral Exam for 4<sup>th</sup> Level Students of**  
**"Selected Topics in Analytical Chemistry" (C-444)**

**Answer the following question:**

**Put (✓) or (x) for the following:**

**(10 Marks)**

- 1- Disinfection makes water safe to drink.
  - 2- Coagulation gives water a sparkling appearance.
  - 3- Potassium periodate can not be used for the detection of arbutin.
  - 4- The shift of  $\lambda_{\max}$  for bathochromic shift occurs to longer wavelength.
  - 5- Static quenching involving collisions with other molecules that result in the loss of excitation energy.
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**"Good Luck"**

**Examiners:**

**Prof. Dr. Hassan Sedaira**

**Dr. Ahmed Mohamed Kamal**

**Dr. Doaa Abdel-Rahman**





Assiut University

Time: 3 h

Date: 13 / 7 / 2020



Faculty of Science  
Chemistry Department

Answer the Following Questions:

Section (1) Surface Chemistry

I- Choose the correct answer

(38 Marks)

- To get a n-type semiconductor, the impurity to be added to silicon should have which of the following number of valence electrons?  
(i) 1                      (ii) 2                      (iii) 3                      (iv) 5
- Doping of silicon with boron leads to .....  
(i) n-type semiconductor    (ii) p-type semiconductor    (iii) Metal    (iv) Insulator
- A semiconductor of Ge can be made p-type by adding ..... impurity.  
(i) Trivalent                      (ii) Tetravalent                      (iii) Pentavalent                      (iv) Divalent
- What type of crystal defect is indicated in the diagram below?  

$$\begin{array}{ccccccc} \text{Na}^+ & \text{Cl}^- & \text{Na}^+ & \text{Cl}^- & \text{Na}^+ & \text{Cl}^- & \\ & \text{Cl}^- & \text{Cl}^- & \text{Na}^+ & \text{Na}^+ & & \\ \text{Na}^+ & \text{Cl}^- & \text{Cl}^- & \text{Na}^+ & \text{Cl}^- & & \\ & \text{Cl}^- & \text{Na}^+ & \text{Cl}^- & \text{Na}^+ & \text{Na}^+ & \end{array}$$
  
(i) Frenkel defect                      (ii) Schottky defect                      (iii) Interstitial defect  
(iv) Frenkel and Schottky defects
- In the Bragg's equation for diffraction of X-rays, n represents .....  
(i) Quantum number    (ii) An integer    (iii) Avogadro's numbers    (iv) Moles
- The existence of a substance in more than one solid modifications is known as .....  
(i) Polymorphism    (ii) Isomorphism    (iii) Anisotropy    (iv) Enantiomorphism
- Point defects are present in .....  
(i) Ionic solids    (ii) Molecular solids    (iii) Amorphous solids    (iv) Liquids
- The materials which are weakly repelled by the magnetic field are known as .....  
(i) Diamagnetic materials    (ii) Paramagnetic materials    (iii) Ferromagnetic materials  
(iv) Ferrimagnetic materials

9. Which of the following statements is true?
- (i) Paramagnetic substances are attracted by the magnetic field.
  - (ii) Paramagnetic substances are strongly repelled by the magnetic field.
  - (iii) Paramagnetic substances are neither attracted nor repelled by the magnetic field.
  - (iv) Paramagnetic substances are either attracted or repelled by the magnetic field.
10. The space between the outermost filled energy band and the next empty band is called.....
- (i) Valence band    (ii) Conduction band    (iii) Forbidden zone    (iv) None of these
11. With increase in temperature, the electrical conductivity of semiconductors .....
- (i) Decreases    (ii) Remains same    (iii) Increases    (iv) None of these
12. The n-type semiconductor is
- (i)  $[D]=[A]$     (ii)  $[A] > [D]$     (iii)  $[D] > [A]$     (iv) none
13. Schottky defect is shown by .....
- (i) Strongly ionic compounds    (ii) Compounds having high coordination number
  - (iii) Compounds containing cations and anions of almost similar size    (iv) All of these
14. A solid having irregular shape is called ..... solid.
- (i) Amorphous    (ii) Crystalline    (iii) Anisotropic    (iv) Isomorphous
15. Extent of physisorption of a gas increases with .....
- (i) Increase in temperature    (ii) Decrease in temperature
  - (iii) Decrease in surface area    (iv) Decrease in strength of Vander Waals forces
16. What will be the intercept in graph Freundlich isotherm
- (i)  $K$     (ii)  $\log k$     (iii)  $\frac{1}{a}$     (iv)  $\frac{1}{n}$
17. On which factor adsorption of gas on solid adsorption depend
- (i) On temperature    (ii) On pressure of gas    (iii) On nature of adsorbent
  - (iv) All the given
18. The industrial catalyst should be characterized by
- (i) High surface area    (ii) Mechanical properties    (iii) Stability    (iv) All of them
19. Selective catalyst should .....
- (i) Increase the reaction rate    (ii) Change the reaction products
  - (iii) Increase the number of molecules adsorbed on the catalyst surface
  - (iv) Proceed the reaction to desired product



II- Put (✓) or (×) for following sentences

(22 Marks)

- 1- Isomorphism is a compound with two different crystal forms ( )
  - 2- The repeated motion many times in the crystals responsible for the plasticity of crystals ( )
  - 3- The freedom of the valance electrons to move through a metal give rise to low electrical conductivity ( )
  - 4- If the reflections of all lattice positions through a point brings a coincidence of point there is a center of symmetry ( )
  - 5- Chemical imperfections results from doping by foreign cations ( )
  - 6- The position in energy of the absorption peaks associated with defect centers provides a direct measure of the ionization energy of an electron attracted to the center ( )
  - 7- Paramagnetic results from the presence of a permanent dipole moment ( )
  - 8- The doping of NiO with  $\text{Li}^+$  decreases of its electrical conductivity ( )
  - 9- The doping of ZnO with  $\text{Al}^{3+}$  increases of its electrical conductivity ( )
  - 10- A catalyst may lose its activity or its selectivity by reduction of active area by sintering ( )
  - 11- A catalyst support is unstable under reaction and regeneration ( )
- 

Section (2) Electrochemistry Chemistry

Choose the correct answer

(30 Marks)

$F = 96500 \text{ C}$ ,  $R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$ ,  $0.082 \text{ L atm K}^{-1} \text{ mol}^{-1}$ ,  $A = 0.509 / (\text{mol kg}^{-1})^{1/2}$ ,  $\text{Cu} = 63.55$ ,  $\text{Cl} = 35.45$

- 1- The standard cell potential of the reaction:  $\text{Mg (s)} + \text{H}_2\text{O (l)} + \frac{1}{2} \text{O}_2 \text{ (g)} = \text{Mg(OH)}_2 \text{ (s)}$   
 $\Delta G^\circ = -420.6 \text{ kcal}$   
(i) -9.12 V      (ii) 9.12 V      (iii) 2.18 V      (iv) -2.18 V
- 2- The electrolyte is an ..... conductor.  
(i) ionic      (ii) electronic      (iii) electronic and ionic      (iv) atomic
- 3- Methanol solution is .....  
(i) Strong electrolyte    (ii) weak electrolyte    (iii) non-electrolyte    (iv) normal electrolyte



4- The salt activity mathematical form of  $\text{Al}_2(\text{SO}_4)_3$  is

- (i)  $27 C^3 \gamma_{\pm}^5$       (ii)  $27 C^5 \gamma_{\pm}^5$       (iii)  $27 C^6 \gamma_{\pm}^6$       (iv)  $108 C^5 \gamma_{\pm}^5$

5- What is the ionic strength of 0.2 M  $\text{MgCl}_2$ ?

- (i) 1.2 M      (ii) 0.3 M      (iii) 0.4 M      (iv) 0.6 M

6- According to the Debye-Hukel limiting law, the value of  $\gamma_{\pm}$  for  $1 \times 10^{-3}$  m solution of KCl is

- (i) 0.95      (ii) 0.94      (iii) 0.96      (iv) 0.98

7- The salt effect on the reaction:  $[\text{Co}(\text{NH}_3)_5\text{Br}]^{++} + \text{OH}^- \rightarrow [\text{Co}(\text{NH}_3)_5\text{OH}]^{++} + \text{Br}^-$

- (i) Zero      (ii) Positive      (iii) Negative

8- The salt effect on the reaction:  $\text{CH}_2\text{I}\text{COOH} + \text{CNS}^- \rightarrow \text{CH}_2(\text{CNS})\text{COOH} + \text{I}^-$

- (i) Zero      (ii) Positive      (iii) Negative

9- "The electric double layer consists of a compact layer and followed by a diffuse layer of counter ions", this theory is called:

- (i) Helmholtz      (ii) Stern      (iii) Gouy and Chapman      (iv) none of these

10- The polarizable electrode is characteristic by:

- (i) Small surface area      (ii) Large surface area      (iii) Over current      (iv) Over potential

11- By electrical analysis of  $\text{CuCl}_2$  molten salt, 1.5 A were passed for 1.5 hour, the deposited copper was:

- (i) 1.78 g      (ii) 1.52 g      (iii) 0.028 g      (iv) 3.5 g

12- The volume of chlorine gas, in the above problem, collected at one atm and 273 K was:

- (i) 1.78 L      (ii) 0.028 L      (iii) 3.5 L      (iv) 0.63 L

13- If over potential ( $\eta$ ) of an electrode is positive, the electrode reaction is

- (i) Reduction reaction      (ii) Oxidation reaction      (iii) Redox reaction      (iv) non

14- If over potential ( $\eta$ ) of an electrode is negative, the electrode reaction is

- (i) Reduction reaction      (ii) Oxidation reaction      (iii) Redox reaction      (iv) non

15- The exchange current density for the evolution of hydrogen at platinum is  $4.0 \text{ A m}^{-2}$ . What is the current density at 298 K for an over potential 5 mV?

- (i)  $0.623 \text{ A m}^{-2}$       (ii)  $0.55 \text{ A m}^{-2}$       (iii)  $0.78 \text{ A m}^{-2}$       (iv)  $0.78 \text{ mA m}^{-2}$

### Oral Exam

#### Answer the Following Questions:

State (✓) or (✗) and give the right answer if any for the following (10 Marks)

- 1- The number of charge carriers that can result from ordinary donor or acceptor ionization is  $[D] + [A]$  ( )
- 2- The volume of gas adsorbed to form monolayer  $V_m$  is equal to slope x intercept ( )
- 3- An adsorption isotherm is the relationship between the volume adsorbed and pressure at constant temperature. ( )
- 4- The polarization cell consists of two electrodes, cathode and anode. ( )
- 5- The Tafel's equation is applied to study the kinetic of cell reaction. ( )

----- Good Luck -----

Prof. Dr. Abd El-Aziz A. Said, Prof. Dr. Abo El-Hagag Abd El-Aziz

Petrochemicals(409C)

Final Exam. for the 4<sup>th</sup> level Students ( Industrial Chemistry)

Put right (✓) or Wrong (X) on the following statements, and Justify  
your answer : ( 50 x 2 =100 ≡ 70 Marks)

- 1-Coal is a natural source for renewable energy ( )
- 2- Natural gas was formed via solar energy storage ( )
- 3-Oil, Natural gas and Atomic Energy are fossil fuels ( )
- 4- Nuclear fuel is an alternative for natural gas in petrochemical industries ( )
- 5- Natural gas and coal gasification products are feed stocks in petrochemistry. ( )
- 6-Butane, Acetylene, ....etc. are used as feed stocks in petrochem. Indust. ( )
- 7- Coal is not used as raw material for benzene and naphthalene production ( )
- 8-Brown coal contains higher amount of water and carbon ( )
- 9-Gasoline, crack gas and synthesis gas have the same chemical composition ( )
- 10-Natural gas and heavy oil fractions are not suited for synthesis gas ( )
- 11-The production of synthesis gas from natural gas and steam involves only  
endothermic process ( )
- 12-The production of synthesis gas from oil and steam involves only  
Exothermic process. ( )
- 13- Allothermal and autothermal processes are not involved in synthesis gas  
Production from oil and steam ( )
- 14- Methyl alcohol is used in purification processes of synthesis gas ( )
- 15-  $-(CH_2)- + H_2O_2 \rightarrow CO + H_2$  [  $\Delta H = - 36 \text{ K.Cal.}$  ] ( )
- 16- Hydrocarbons can be produced by Fischer-Troposch synthesis ( )
- 17- Synthesis gas is a source for  $H_2$ , CO and methanol ( )
- 18- CO can be applied with  $H_2$  for production of methanol and hydrocarbons ( )
- 19- CO can be applied with nucleophiles ( $H_2O$  &  $CH_3OH$ ) to form carboxylic acids ( )
- 20-Phosgene ( $COCl_2$ ) can be formed from CO and bromine ( )
- 21- Synthesis gas can be obtained from light hydrocarbons through allothermal  
Catalytic reforming process ( )
- 22- Synthesis gas can be formed from heavier petroleum fractions by  
autothermal partial oxidation ( )
- 23-Production of hydrogen during aromatization and desulfurization  
Processes is possible ( )
- 24- Hydrogen gas can be used in hydrocracking and hydrotreating processes ( )
- 25- Most of methanol is consumed in chemical industries , only  
~ 10 % Is used in energy production . ( )
- 26- Methanol is used to improve knocking, it has medium Octane Number ( )
- 27- Yeast and Bacteria can synthesize protein from methanol and ethanol ( )

الاجابة على كل صغرة :



- 28- Formaldehydes is available in only two commercial forms. ( )
- 29- Ag catalysts are preferred for oxidative dehydrogenation of methanol to formaldehyde ( )
- 30- Formic acid can be synthesized directly from CO hydrolysis with water ( )
- 31- Methyl formate is a prospective synthetic unit in  $C_1$  chemistry for synthesis of ethylene glycol,  $CH_3CHO$ ,  $CH_3COOH$  ( )
- 32-  $HCOOCH_3 + CH_2=CH_2 + catalyst \rightarrow CH_3CH_2COOCH_2CH_3$  ( )
- 33-  $HCOOCH_3 + H_2NCH_2CH_3 + catalyst \rightarrow HCONHCH_3 + CH_3OH$  ( )
- 34- Cyanogen chloride can be obtained via the reaction:
- $$HCN + Cl_2 \rightarrow ClCN + HCl \quad ( )$$
- 35-- Cyanuric chloride is a trimer of cyanogen chloride ( )
- 36- Melamine can be synthesized by reaction of  $NH_3$  with cyanuric chloride ( )
- 37- Freon is a dichlorodibromomethane, can be used as a refrigerant ( )
- 38- Acrylonitrile can be prepared from Acetylene by reaction with HCl. ( )
- 39- Alkylation of benzene with propylene tetramer gives Toluene ( )
- 40- Styrene, the monomer of polystyrene polymer can be obtained from the reaction of benzene and ethyl alcohol in one step. ( )
- 41- Isoprene is 3-methyl-1,3-pentadiene and represents the building unit of natural rubber. ( )
- 42- Glycerol can be obtained from propylene in many steps. ( )
- 43 - Viscose can be prepared from  $CO_2$  & cellulose in basic medium ( )
- 44- Plastics are soft and easy to turn into many different forms during manufacture. ( )
- 45- Colorants, plasticizers, stabilizers and fillers are normal ingredients in polymers industry. ( )
- 46- Oxidation of n-propane gives Acetaldehyde ( )
- 47- Nitration of ethane gives Nitroethane ( )
- 48- Oxidation of Propylene gives Acrolein ( )
- 49- X- Ray Scattering is used to investigate the crystal structure of the polymer ( )
- 50- Recycling of polymers is not necessary in our life ( )
-

**For Oral Examination: ( Answer on 5 only)**

**(5 x2 =10 Marks)**

- 1- Fossil fuels are used only as raw materials in petrochemical industries ( )
- 2- Fischer- Troposch method gives synthesis gas from coal gasification ( )
- 3- Benzene and benzine have the same molecular structure. ( )
- 4- Synthetic fibers have less melting temperature, poor insulation, burn more rapidly, and not skin friendly. ( )
- 5- Hair, silk, Dacron and Terylene are polyamides ( )
- 6- Plastic recycling and production of biodegradable plastics are needed for solving environmental pollution problems. ( )

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**Good Luck**

**Prof. Dr. Aboe Magd A. Abdel Wahab**

Assiut University

Faculty of Science

Chemistry Department

**Final Examination**

**Fiber and Textiles C- 404 Fourth Year; Industrial Chemistry**

July:2020

Time:2 hrs

**Answer the following:**

- 1) Discuss the physical properties of fiber related to durability.
- 2) Tabulate the morphology and chemical structure of both cotton and wool fiber.
- 3) Discuss the relation between the following:
  - a) Luster and contour of fiber.
  - b) Electrical conductivity and Absorption in fibers.
  - c) Burning and chemical composition of fibers

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**Good Luck**

**Examiner: Prof.Dr.Saoud.A.Metwally**





**Final Examination for B.Sc. (Chemistry major)**  
**Applied Organic Chemistry (412 C): (Polymers & Material science & Textiles & Dyes)**

Date: Saturday, 011/07/2020

Time: 2 hours

Answer the following questions in the same papers:**A) Complete the following table:**

Polymer	Abbreviation	Structural formula of monomer	Structural formula of polymer
Polymethylmethacrylate			
Polyvinyl chloride			
Polypropylene			
Polyethylene			

<b>Polyethylene terphthalate</b>			
<b>Teflon</b>			
<b>Polystyrene</b>			

B) Complete the following table:

<b>Polymer</b>	<b>Structural formula of monomer</b>	<b>Structural formula of polymer</b>	<b>Uses</b>
<b>Nylon- 6,6</b>			

ar			
Dacron			
Urea-methanal			

**C) Choose The Correct answer**

1. The possibility to prepare polyethylene from :

- i) Cyclohexane    ii) Ethylene gas    iii) n-propane



2. Condensation polymerization go through :

- i) Double bond    ii) Triple Bond    iii) Difunctional groups

3. Addition polymerization go through :

- i) Double bond    ii) Cyclic Ring    iii) Difunctional groups

4. The word "Polymer" came from :

- i) Muaaraba    ii) Translated    iii) Both

5. An example for Initiator to anionic polymerization:

- i) Butyl chloride    ii) Butyl lithium    iii) Butyl fluoride    iv) Butyl sulphide

6. Nylon 6,6 can be prepared from:

- i) Hexamethylenediamines with sebacoyl chloride    ii) Hexamethylenediamines with adipoyl chloride    iii) Hexamethylene-diamines with terephthaloyl chloride.

7. Starch and Cellulose come from:

- i)  $\alpha$ -glucose and  $\beta$ -glucose    ii)  $\alpha$ -glucose and  $\beta$ -sucrose  
iii)  $\beta$ -maltose and  $\alpha$ -maltose    iv)  $\alpha$ -glucose and  $\beta$ -fructose.

8. "Carbon Fibers...the wonder polymer... stronger than the steel". It prepared from:

- i) Polyacrylamide    ii) Polymethylacrylate    iii) Polyacrylonitrile  
ii) iv) Polyacrylic acid.

9. Polypropylene as example for:

- i) Branched polymer    ii) star polymer    iii) linear polymer  
ii) iv) Dendrimers

10. Free radical polymerization consist from:

- i) Initiation step    ii) propagation steps    iii) termination step    iv) All the previous steps.

11) The exception for the preparation of polyurethane :

- i) Came from difunctional monomers    ii) No byproduct    iii) both the previously.

12) The main difference between step-growth and chain growth polymerization is:

- i) The unsaturated center    ii) Difunctional groups    iii) Byproduct    iv) all of them

13) Which one of these monomers needed the smallest time (mention it) in polymerization:

- i) Vinyl Chloride,                      ii) Styrene,                      iii) MMA).

14) Which of these polymers are : branched, linear or cross linked:

Polyethylene, Polypropylene, Polyisoprene, Polyester, Polystyrene, Polybutadiene, Nylon.

15) Coordination polymerization using Ziegler-Natta catalyst use:

- i) Titanium Monochloride   ii) Titanium dichloride   iii) Titanium Tetrachloride  
iv) Titanium oxychloride

16) Coordination polymerization using Ziegler-Natta catalyst use:

- ii) Trialkyl Aluminum   ii) Mono-alkyl Aluminum   iii) Di-alkyl Aluminum   iv)  
All of them.

17) Nylon 6 came from Monomer called:   i) Caprolacton   ii) Caprolactame   iii)  
Caprolactine   iv) Caprolactyne

18) The Paradoxical Role of Oxygen means : i) Inhibition   ii) Initiation   iii) Both of them.

19) In the thermal initiators, which compounds are used:

- i) Hydrazo-compounds   ii) Azo-compounds   iii) Azomethine compounds

20) An example for Initiator to cationic vinyl polymerization:

- i) Sodium hypochlorite   ii) Aluminum chloride  
iii) Sodium chloride   iv) Potassium chloride

21) The carbon fiber named this its name because:

- i) It contains Hydrogen only   ii) It contains Carbon only   iii) It contains both H and C.

22) The main difference between Kevlar and Nylon is : i) the two monomers are aromatic   ii) One aromatic and another aliphatic   iii) Both of them.

23) The difference between Dacron and Terylene : i) Due to its chemical structure   ii) Due to Original country   ii) Due to its mechanical properties.

24) In Urea-Methanal polymer, it came from : i) urea and methanol   ii) Urea and ethanol   iii) Urea and formaldehyde.   iv) Urea and acetaldehyde



**D) Complete the following sentences:**

1) Three things make the polymers are different:

i) ..... ii) ..... iii).....

2) Polymers Like ....., both have lots and lots of .....

3) The best advantage of polymeric materials are:

i)....., ii).....iii).....

iv).....v).....vi).....

4) The main classification for the polymers are:..... and .....

5) HIPS copolymer came from the copolymerization of ..... and .....

6) Bubble gum came from ..... and .....

7) Cotton is a .....polymer and its monomer named .....

8) Types of copolymers:

i) ..... ii) .....

ii) ..... iv) , .....

9) Backbitting means: .....

.....

.....

10) Dianion means:.....

.....



11) Self initiator means:.....

.....

12) Types of Initiators with examples.

.....

.....

.....

.....

.....

13) In the living polymerization, we put an ending for the living chain (Carbanion) by :

i).....

ii).....

iii).....

14) The classification and the chemical structures for the synthetic Dyes according to the type of chromophores present ?

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15) The Advantages, Disadvantages, for:

i) Cotton -----

ii) Wool -----

iii) Silk -----

iv) Polyesters -----

16) The significance of fiber evidence and using the fibers to reconstruct crime scenes :

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17) The main tests for the identification of Fibers?

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18) The hole appears when a dilute alkali is spilt on a fabric made of polyester because:

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**Good Luck**

**Examiner:**

**Prof. Dr. Kamal Ibrahim Aly**

Final exam of Chemistry of biomolecules (413C) for double major-chemistry Students  
(Chemistry of carbohydrates, amino acids & proteins, Lipids and nucleic acids)

Answer the following questions:

**I. Choose the correct answer of the following:**

(45 Marks)

- 1) Sugars that differ only in their stereochemistry at a single carbon are termed:  
a) Epimers.                      b) Anomers.                      c) Monomers
- 2) Sugars formed because of formation of cyclic structures. The  $\alpha$ - and  $\beta$ - forms which differ in configuration at C1 only in aldoses or at C2 in ketoses:  
a) Monomers                      b) Epimers.                      c) Anomers.
- 3) Acetylation of glucose gives:  
a) penta acetate derivative    b) two different penta acetates    c) two different tetra- acetates
- 4) Oxidation of glucose with nitric acid gives:  
a) Saccharic acid                      b) Gluconic acid                      c) Glucuronic acid                      d) Glycolic acid
- 5) Lactose is a reducing sugar and consists of:  
a) Glucose + fructose, linked 1-2'.                      b) Two glucose units linked 1-4'.  
c) Galactose + glucose linked 1-4'.                      d) Two glucose units linked 1-5'.
- 6) Maltose is a reducing sugar and consists of:  
a) Glucose + fructose, linked 1-2'.                      b) Two glucose units linked 1-4'.  
c) Galactose + glucose linked 1-4'.                      d) Two glucose units linked 1-5'.
- 7) Which one of the following acids give the furfural derivative when react with glucose?  
a) conc.  $H_2SO_4$ .    b) Conc. nitric acid.                      c) conc. HCl.
- 8) Cellulose is a polysaccharide composed of several thousand of D-glucose units jointed by:  
a)  $\beta$ -(1, 4') glycosidic linkage.                      b)  $\beta$ -(1, 2') glycosidic linkage.  
c)  $\beta$ -(1, 5') glycosidic linkage.                      d)  $\beta$ -(2, 5') glycosidic linkage.
- 9) Rayon (or viscose) is a:  
a) Cellulose acetate.                      b) Cellulose nitrate                      c) Regenerated cellulose                      d) Cellulose xanthate
- 10) Reaction of glucose with excess phenyl hydrazine followed by hydrolysis with conc. HCl gives:  
a) Glucosone .                      b) Phenylglucoazone.                      c) fructose.
- 11) Which one of the following acids converts glucose to 5-hydroxymethyl furfural aldehyde?  
a) conc.  $H_2SO_4$                       b) conc. HCl                      c) conc.  $HNO_3$
- 12) Which one of the following acids converts glucose to elemental carbon?  
a) conc.  $H_2SO_4$                       b) conc.  $HNO_3$                       c) conc. HCl
- 13) Which one of the following is not reducing sugar?  
a) Maltose.                      b) Lactose.                      c) Sucrose.                      d) Glucose
- 14) Osazones are not formed with:  
a) Glucose.                      b) Maltose.                      c) Lactose.                      d) Sucrose
- 15) D and L forms are determined by the orientation of the hydroxyl group ( $-OH$ ) around:  
a) The pre-last carbon atom                      b) Last carbon atom                      c) First carbon
- 16) The gradually change of rotation of  $\alpha$  and  $\beta$  anomers of glucose to equilibrium value is called:  
a) Epimerization                      b) Mutarotation.                      c) Condensation.
- 17) Which pair of the following sugars give the same osazone:  
a) Glucose, mannose    b) glucose, galactose                      c) mannose, galactose
- 18) Which one of the following amino acids has no stereocenter (has no chiral carbon atom)?  
a) Glycine.                      b) Alanine.                      c) Aspartic acid                      d) Tryptophan.
- 19) Carrying out the Strecker amino acid synthesis on acetaldehyde gives:  
a) Glycine                      b) Alanine                      c) Aspartic acid                      d) glutamic acid
- 20) The sequence of amino acids in a polypeptide chain is called:  
a) Primary structure    b) Secondary structure                      c) Tertiary structure                      d) Quaternary structure



- 21) Which one of these amino acids is not optically active?  
 a) Cysteine                      b) Lysine                      c) Arginine                      d) Glycine
- 22) Proteins are made up of  $\alpha$ -amino acids units, linked together by:  
 a) Peptide linkage.    b) Glycosidic linkage.    c) Phosphodiester linkage    d) Ester linkage.
- 23) The amino acid has equal tendencies to form either of positively or negatively charged molecules at:  
 a) The isoelectric point.    b) The melting point.    c) The boiling point.    d) End point.
- 24) Rancidity increases as:  
 a) The molecular weight increase.                      b) The molecular weight decrease.  
 c) The number of double bonds increases.    d) The number of double bonds decreases.
- 25) The number of milligrams of KOH required to completely saponify one gram of fat is termed:  
 a) Saponification number.    b) Iodine value.    c) Acid value.
- 26) Alkaline hydrolysis of oils leads to the formation of:  
 a) Metallic salt of fatty acids and glycerol    b) Fatty acids and metallic salt of glycerol  
 c) Metallic salt of fatty acids and metallic salt of glycerol    d) Soap only
- 27) Separation of amino acid mixture by Electrophoresis depends on:  
 a) Solubility.                      b) Isoelectric point.                      c) Melting point.    d) Boiling point.
- 28) The amino group of amino acids reacts with nitrous acid and converted to hydroxyl group:  
 a) With liberation of  $N_2$  gas.    b) With liberation of  $CO_2$  gas.    c) With liberation of CO gas
- 29) The main difference between fats and oils is that oils have:  
 a) Large percent of unsaturated fatty acids.    b) low percent of unsaturated fatty acids.    c) None of them
- 30) In nucleic acids, the nucleotide monomers linked together via a:  
 a) Phosphodiester linkage    b) Peptide linkage    c) Glycosidic linkage

**II. Put (✓) in the front of the correct Statement and (X) in the front of the wrong one: (25 Marks)**

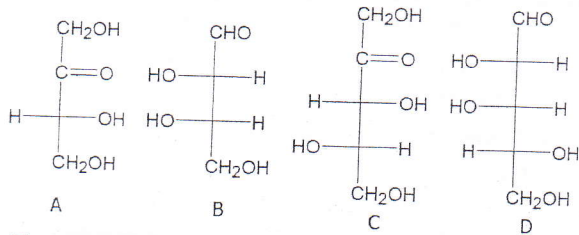
- 1- D-glucose and D-galactose are epimers and give the same osazone.
- 2- Glycyl-L-alanyl glycine is tripeptide.
- 3- Reduction of fructose gives sorbitol and mannitol.
- 4- Acetylation of glucose gives two different penta- acetate derivatives.
- 5- Glucose can be converted to mannose by heating with organic base.
- 6-Glucose gives the characteristic reactions of aldehydes as the color with Schiff reagent
- 7- Reduction of glucosone gives fructose.
- 8- All sugars are carbohydrates but not all carbohydrates are sugars.
- 9- The sign (+ or -) of rotation is experimental value and not depends on the D or L configuration
- 10- The presence of solid  $\alpha$ -amino acid as Zwitter ion explains its high melting points.
- 11- In proteins, the amino acids joined by glycoside linkage.
- 12- All protein-derived amino acids except glycine have at least one stereocenter and are chiral.
- 13- Dialysis is a property, which used to separate proteins from small molecular weight compounds.
- 14- Glycyl alanine and alanyl glycine are the same dipeptide.
- 15-All amino acids containing one amino group and one carboxylic group
- 16) Amino acids can't be directly titrated against alkalis, because of the interference of the amino group.
- 17) Esterification of glycine with ethanol in presence of hydrogen chloride gives Ethyl glycinate-HCl.
- 18) Glycine reacts with nitrous acid to give glycolic acid with liberation of  $CO_2$  gas.
- 19) Proteins are amphoteric depending on the pH of the solution
- 20) In Gabriel's synthesis, potassium phthalimide is used with halo acid to give the amino acid.
- 21-The triesters of fatty acids with glycerol compose the class of lipids known as fats and oils.
- 22- The iodine value for triolein is equal to zero.
- 23- Soap is the sodium salt of fatty acids.
- 24-Mild hydrolysis of nucleic acids yield their monomeric units, compounds called nucleotides
- 25-Unlike proteins, nucleic acids contained no sulfur.

-انظر الورقة الثانية الملحق أسئلة الجزء الشفوي -

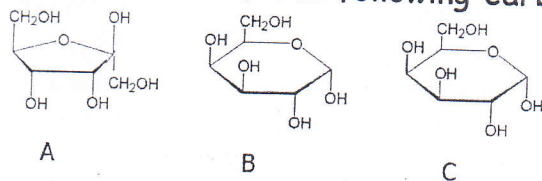
## Oral examination part (10 marks)

Choose the right answer for the following:

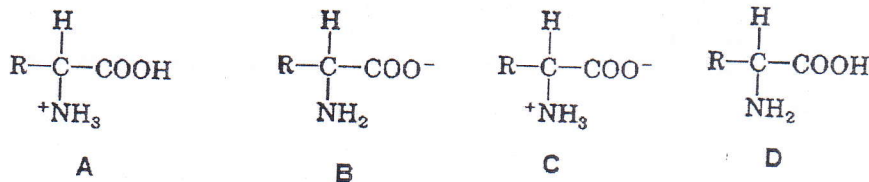
1) Which one of the following monosaccharides is D-aldopentose?



2) Which one of the following carbohydrates is  $\beta$ - form?

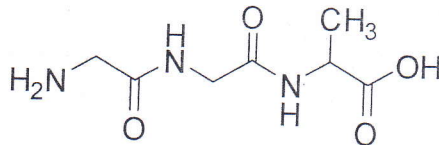


3) Which one of the following is the zwitter ion?

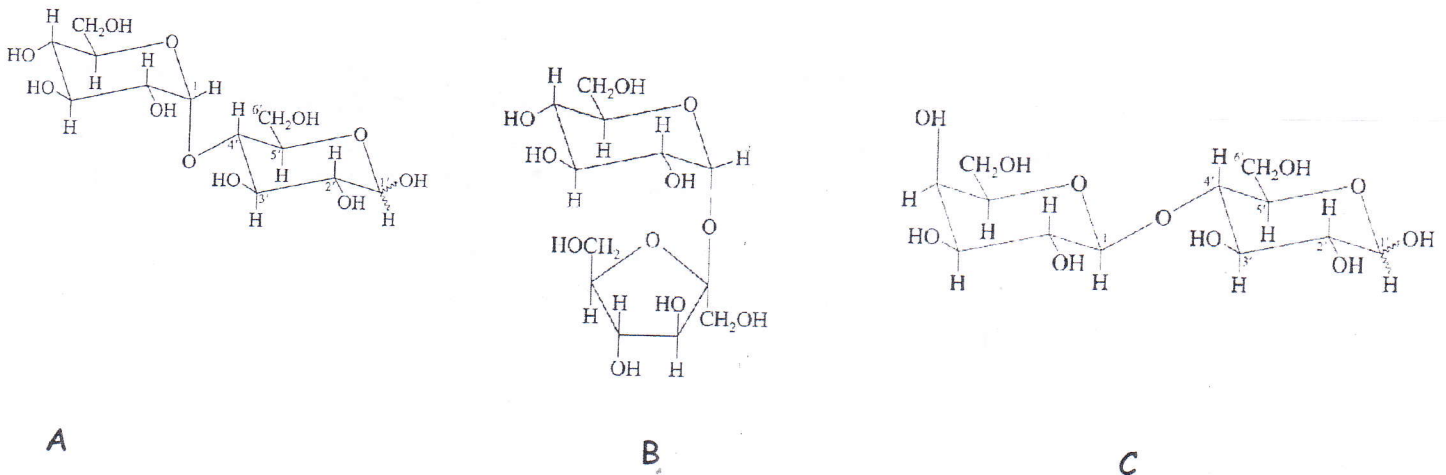


4) Which name represents the following tripeptide?

- a) Glycyl glycyl alanine
- b) Glycyl alanyl glycine
- c) Alanyl glycyl glycine



5) Which of the following is the sucrose sugar?





Examination of Industrial Catalysis for 4<sup>th</sup> Level Students (Chem.401)

Applied Industrial chemistry



Assiut University

Time :2 h

Date: 13 / 7 / 2020



Faculty of Science  
Chemistry Department

Answer the Following Questions:

I- Choose the correct answer

(30 Marks)

1. The industrial catalyst should be characterized by

- (i) High surface area    (ii) Mechanical properties    (iii) Stability    (iv) All of them

2. Selective catalyst should .....

- (i) Increase the reaction rate    (ii) Change the reaction products  
(iii) Increase the number of molecules adsorbed on the catalyst surface  
(iv) Proceed the reaction to desired product

3. What is true for catalytic reaction

- (i) Catalyst increases equally both the rate of forward and reverse reactions  
(ii) Catalyst does not effect to equilibrium constant  
(iii) Catalyst decreases activation energy    (iv) Catalyst increases activation energy

4. What is the features of catalytic processes for manufactures of organic compound

- (i) They are highly exothermic    (ii) Certain compound may be explosive  
(iii) The desired product must be stable    (iv) All of them

5. Effective catalysts for oxidation reactions are

- (i) Transition metal oxides    (ii) Metal halides    (iii) Metal with physisorbed oxygen  
(iv) None

6. Preparation of  $\text{Cu/ZnO/Al}_2\text{O}_3$  as an active catalyst for synthesis of methanol proceeds as.

- (i) The original catalyst was obtained by Co-Precipitation  
(ii) Calcination to decomposition of the primary phases  
(iii) Reduction of the calcined precursor    (iv) All of them



7. A basic concept of catalyzed reactions explained by
- (i) The geometrical theories    (ii) Electronic theories    (iii) Chemical approach
  - (iv) All of them
8. According the chemical approach the desirable energy for decomposition the intermediate complex is:
- (i) High energy    (ii) Low energy    (iii) Intermediate energy    (iv) None
9. What is not true for a good catalyst.
- (i) Selective    (ii) Active    (iii) Stable    (iv) Expensive
10. A Catalyst may lose its activity or its selectivity by
- (i) Poisoning    (ii) Block of some pores    (iii) creation of active site    (iv) All of them
11. The disadvantage of a homogeneous catalyst is.
- (i) Corrosion problems    (ii) Poisonous    (iii) Expensive    (iv) All of them
12. What is not true for desirable characteristic of support
- (i) Desirable mechanical properties    (ii) High surface area    (iii) Low coat
  - (iv) Unstable under reaction and regeneration conditions.
13. What is not true for  $\gamma$ -alumina support.
- (i) Has high surface area    (ii) Is relatively stable over the temperature range
  - (iii) It can be used as catalyst    (iv) It converts to  $\alpha$ -alumina at  $500^{\circ}\text{C}$
14. The possible mechanism of structural promoter is
- (i) It has a dual-function action
  - (ii) The promoter may unchanged the electronic structure of a catalyst
  - (iii) The promoter has no effect on the structure of a catalyst
  - (iv) the promoter has no effect on the effective activation energy
15. Selectivity of a catalyst will vary with
- (i) Pressure    (ii) temperature    (iii) Composition    (iv) All of them

II- Put (✓) or (x) for following sentences

(40 Marks)

1. The turnover number is the number of molecules that react per site per unit time ( )
2. The maximum rate of reaction is obtained when the bond between the adsorbed complex and the catalyst surface is too weak ( )
3. A catalyst may lose its activity or its selectivity by reduction of active area by sintering ( )
4. A catalyst support is stable under reaction and generation conditions ( )
5. Structure promoter changes the chemical composition of the catalyst ( )
6. Negative catalyst is a substance which decreases the rate of reaction ( )
7. The activity of a catalyst refers to the rate at which it causes the reaction to proceed to chemical equilibrium ( )
8. A number of acidic solids can catalyze a wide variety of reactions similar to those catalyzed by strong mineral acids ( )
9. In Wacker process ethylene is oxidized to acetaldehyde ( )
10. In impregnation method for synthesis of a catalyst requires more equipment ( )
11. Extrusion proceeds as a solution is extruded through a die with multiple holes and cut off to form short cylinders ( )
12. A support was that of an active substance that provided a means of spreading out of an expensive catalyst ( )
13. The hydrolysis of sodium aluminate as the following equation
$$2\text{NaAlO}_2 \rightarrow \text{NaOH} + \text{Al}_2\text{O}_3 \quad ( )$$
14. A texture promoter is an inert substance which enhances the sintering of microcrystals ( )
15. Acrylonitrile was manufactured according to the following equation
$$\text{NH}_3 + \text{C}_3\text{H}_6 \rightarrow \text{CH}_2 = \text{CHCN} \quad ( )$$
16. Acrolein was manufactured by the equation
$$\text{CH}_3\text{CH} = \text{CH}_2 + \text{O}_2 \rightarrow \text{CH}_2 = \text{CHCHO} + \text{H}_2\text{O} \quad ( )$$
17. The conversion of acrolein to acrylic acid can be written :
$$2 \text{CH}_2 = \text{CHCHO} + \text{H}_2\text{O} \rightarrow 2 \text{CH}_2 = \text{CHCOOH} \quad ( )$$



18. Ethylene can be oxidized to ethylene oxide with low selectivity over supported silver catalyst ( )
19. Iron molybdate catalyst  $\text{Fe}_2(\text{MoO}_4)_3$  used for conversion of methanol  $\text{CH}_3\text{OH}$  to formaldehyde at a reaction temperature of  $200^\circ\text{C}$  ( )
20. The usual catalyst used for oxidation of  $\text{SO}_2$  to  $\text{SO}_3$  is vanadia and potassium sulfate supported on alumina ( )

### Oral Exam

Answer the Following Questions:

State (✓) or (x) and give the right answer if any for the following (10 Marks)

1. The use of two absorbers decrease the overall conversion and minimizes  $\text{SO}_2$  discharge to atmosphere ( )
2. For the oxidation of  $\text{SO}_2$  into  $\text{SO}_3$  over the commercial catalyst depends on  $\text{V}^{4+}/\text{V}^{5+}$  ratio ( )
3. Upon heating  $\gamma$ -alumina at  $500^\circ\text{C}$  converts to  $\alpha$ -alumina ( )
4. Bismuth molybdate and other molybdate catalysts are commercially used for manufacture of acrylonitrile ( )
5. The activity of the most active catalyst used for synthesis of methanol independent on the preparation procedures ( )

----- Good Luck -----

Prof. Dr. Abd El-Aziz A. Said





Second Semester Examination for Biological Students  
Subject: Analytical Chemistry (C- 460)

Answer the following questions: (70 marks)

A. Choose the correct answer: (2 marks for each point)

- 1- End point colour in Mohr method is  
A) Red colour      B) Blue Colour      C) Yellow Colour      D) Black colour
- 2- 0.1M HCl solution is titrated against an unknown NaOH solution. 10mL of the 0.1M HCl is required to reach the equivalency point of 10 mL of NaOH. What is the concentration of the NaOH  
A) 0.05M      B) 0.1M      C) 0.15M      D) 0.2ML
- 3- In an electrolytic cell , metal passes in two ions at  
A) Cathode      B) Anode      C) Salt bridge
- 4- The sum of oxidation number of all atoms in a neutral molecule  
A) 0      B) +5      C) -1      D) +3
- 5- Ions having negative charge  
A) Anion      B) Cation      C) Neutral      D) +7
- 6- Find the oxidation state of Cr in  $\text{Cr}_2\text{O}_7^{2-}$   
A) +7      B) +5      C) +6      D) -1
- 7- If a solution has a  $\text{pOH} = 1$  , it is also considered  
A) Acidic      B) Basic      C) Neutral      D) Cannot be determined
- 8- The auxiliary electrode in polarography  
A) Dropping mercury electrode      B) Mercury pool  
C) Graphite electrode      D) Rotating platinum electrode
- 9- Precipitation titration are classified by which mechanism  
A) Adsorption      B) Color at End Point      C) Ion Exchange      D) All of The Above
- 10- What are the products of the neutralization reaction between HCl and LiOH  
A)  $\text{H}_2\text{O}$       B) LiCl      C)  $\text{H}_3\text{O}^+$  &  $\text{OH}^-$       D)  $\text{H}_2\text{O}$  & LiCl
- 11- Oxidation number of hydrogen ion ( $\text{H}^+$ )  
A) -1      B) +1      C) +4      D) +7
- 12- Oxidation number of fluorine in NaF  
A) +1      B) 0      C) -1      D) -2

- 13 - Find the oxidation state of Mn in  $\text{MnO}_4^-$   
 A) +7                      B) -2                      C) +5                      D) +3
- 14- Phenolphthalein is all of the following EXCEPT  
 A) Neutral    B) Chemical indicator    C) Pink in bases    D) Greenish/yellow in acids
- 15 - In polarography usually  
 A) Voltage constantly measured in negative direction    B) Voltage is kept constant  
 C) Voltage constantly measured in positive direction  
 D) Current either increase or decrease
- 16 - Which Titration is known as the Argentometric titration?  
 A) Acid base Titration                      B) Diazotization Titration  
 C) Gravimetry                      D) Precipitation titration
- 17- Find the oxidation state of V in  $\text{VO}_3^-$   
 A) +3                      B) +4                      C) +5                      D) +6
- 18- Supporting electrolyte is used to suppress  
 A) Diffusion                      B) Migration                      C) Convection                      D) Residual
- 19- Which sentence is false about precipitation titration?  
 A) It must be rapid and quantitative  
 B) It must give insoluble precipitates at end point.  
 C) It must not be affected by co-precipitation or post precipitation  
 D) It must be slow and quantitative
- 20- Ions having positive charge  
 A) Cation                      B) Neutral                      C) Anion                      D) +7
- 21- The diffusion current in polarography is expressed by the equation  
 A) Beer-Lambert law    B) Ilkovic equation    C) Boltzmann equation    D) Bragg equation
- 22- When titrating a strong acid with a strong base, the equivalence point  
 A) Will be below a pH of 7.0                      B) Will be above a pH of 7.0  
 C) Will be at a pH of 7.0                      D) Will be either at above or below a pH of 7.0
- 23- If acidic solution are used in Mohr method  
 A) Chromates ion are decreased                      B) Chromates ion are increased  
 C) A and B                      D) None of the above
- 24-  $\text{HNO}_2(\text{aq})$  is an oxy-acid. Which of the following would best describe its name?  
 A) Nitric acid    B) Hydro nitric    C) Nitrous acid    D) Nitrogen dioxide acid
- 25- The electrode potentials are calculated by:  
 A) Ilkovic equation                      B) Nernst equation                      C) Ohm law

- 26- Which among the following is the strongest oxidising agent  
 A)  $\text{H}_2\text{O}_2$                       B)  $\text{O}_3$                       C)  $\text{K}_2\text{Cr}_2\text{O}_7$                       D)  $\text{KMn}_4$
- 27- All things that are basic will eventually produce  
 A)  $\text{OH}^-$                       B)  $\text{H}_3\text{O}^+$                       C)  $\text{HCl}$                       D)  $\text{H}_2\text{O}$
- 28- An acid base titration involves a  
 A) Composition reaction                      B) Neutralization reaction  
 C) Single replacement reaction                      D) Decomposition reaction.
- 29- If the solution is Basic in nature in Mohr method what happened?  
 A) Silver hydroxide precipitation formation is increased  
 B) Silver hydroxide precipitation formation is decreased  
 C) None of the above                      D) A and B
- 30- A sample contains two different ionic species at different concentration. The two ions can be distinguished in polarography by:  
 A) Half wave potentials                      B) Diffusion currents  
 C) Polarography is confined to solutions containing single type of ions only

**B. Put V or X:- ( 1 mark for each point)**

- 1- Mixed indicators are used in the titration of weak acid with weak base. ( )
- 2- Volhard method potassium chromate used as indicator. ( )
- 3- The equation which give the relation between diffusion current and the concentration of the analyte in polarographic technique given by Ilcovic equation. ( )
- 4- The acid used in Volhard method is sulphuric acid. ( )
- 5- Limitation of argentometric titration are  $\text{SO}_2$  must be removed. ( )
- 6- Specific conductivity is a conductivity of a solution containing equivalent weight of a solute between electrodes  $1\text{cm}^2$  surface area. ( )
- 7- The acid- base indicators are substance presence during the titration renders the end point visible at certain pH very near the end point. ( )
- 8- Mohr method is applicable in basic solution. ( )
- 9- The working electrode used in polarographic cell is dropping mercury electrode. ( )
- 10- Molar conductivity is a conductivity of a solution containing equivalent weight of a solute between electrodes  $1\text{cm}^2$  surface area. ( )

-----GOOD LUCK-----

Prof. Dr.Azza M.M.Ali



Oral Exam: ( 10 Marks )

Answer the following questions:

A. Choose The Correct answer: (1.5 marks for each point )

- 1- If a solution has a pH of 1 then the pOH  
A) 0                      B) 1                      C) 13                      D) 14
- 2- Which of the following are used to suppress the maxima in polarography  
A) Starch                      B) Gelatin                      C) Triton X-100                      D) Potassium chloride
- 3- Find the oxidation state of Fe in  $\text{FeF}_6^{3-}$   
A) +6                      B) +3                      C) +7                      D) -1
- 4- End point colour in Mohr method is  
A) Red colour                      B) Blue Colour                      C) Yellow Colour                      D) Black colour

B. Put  $\checkmark$  or  $\times$ :- (1 mark for each point)

- 1- In the titration of strong acid with strong base the indicator are phenol phthalene and methyl orange. (   )
- 2- Reducing agents are substance gains electrons and is reduced to a lower valency state.(   )
- 3- Lingane equation is  $\log k' = \log k - \log D^{1/2} t^{1/6} m^{2/3} C$ . (   )
- 4- In the titration of weak base with strong acid the indicator is methyl orange. (   )

-----GOOD LUCK-----  
Prof. Dr.Azza M.M.Ali

Final Exam in Selected Topics of Organic Chemistry 414C  
For Fourth Year Science Students

.....  
Section A (30 marks)

A) Answer all the following questions using the check marks (✓) or (X) to indicate whether the following phrases are right or wrong:

- 1- The skin and the acid of the stomach is among the defenses of the body against bacterial invasion ( ).
- 2- Certain bacterial strains can penetrate the intestinal wall to enter the body proper.
- 3- Macrophages engulf bacteria ( ).
- 3- Phenol, formaldehyde, iodine, mercuric chloride, are excellent antiseptics ( ).
- 4- The White Cells (leucocytes) of the blood have a function similar to the macrophages ( ).
- 5- The chemotherapeutic agent must be organotropic and not parasitotropic ( ).
- 6- Chemotherapeutic index = (MCD) / (MTD) ( ).
- 7- Protozoa are vegetable parasites ( ).
- 8- Streptococcus pyogenes, or  $\beta$ -hemolytic streptococcus causes pneumonia ( ).
- 9- Neisseria gonorrhoeae or gonococcus, gives rise to tuberculosis ( ).
- 10- The *p*-aminobenzoic acid (PABA) was is essential metabolite of virus ( ).
- 11- bacteriostatic effect of sulfanilamide was due to drug's blocking of some enzyme system involved in the utilization of another drug ( ).
- 12- Dichlororiboflavin is a potent antagonist of vitamin B<sub>2</sub> ( ).
- 13- Pyridine-3-sulfonamide antagonizes *p*-Aminobenzoic acid (PABA) ( ).
- 14- Disinfectants kill bacteria ( ).
- 15- Disinfectants are bacteriostatic ( ).
- 16- Seventy percent ethanol and 50% n-propanol have been used as disinfectants ( ).
- 17- Xylenols are more active and more soluble than cresols ( ).
- 18- The introduction of chlorine or bromine into phenol or  $\beta$ -naphthol decreases their antiseptic potency considerably ( ).
- 19- The introduction of one hydroxyl- or one methyl group into phenol increases the antiseptic potency considerably ( ).
- 20- The antibacterial effect of sulfanilamide is a result of a structural resemblance between sulfanilamide and (PABA) ( ).
- 21- Pyrithiamine is a metabolite antagonist of sulfathiazole ( ).
- 22- The disinfectant activity of 50% n-propanol for intact skin (e.g., hands) is higher than that of cresol ( ).
- 23- Sulfa drugs are easily estimated in blood and urine ( ).
- 24- Alkylation of N<sup>1</sup> of sulfa drugs reduces the activity ( ).
- 25- Sulfoxazole is water soluble, thus it is used in eye infections ( ).

B) Answer only two of the following questions:

- a) - What is the triple remedy for the helicobacter pylori?
- b) - What is histamine and what does histamine do?
- c) - What is the antiseptic agent?

Section B & C (60 marks)

A- Put (✓) for the correct statement and (×) for the wrong one:

1. A retrovirus is a substance that prevents the synthesis of viral proteins. ( )
2. A tRNA attaches to its specific amino acid during the activation step. ( )
3. A codon is a protein that begins transcription by breaking apart H bonds. ( )
4. A tRNA binds to the AUG codon of the mRNA on the ribosome during the initiation step. ( )
5. When cytidine (C) enters the DNA sequence, it causes substitution mutation. ( )
6. A protease inhibitor is a substance that prevents the synthesis of viral proteins. ( )
7. When a base sequence of TGA in DNA changes to TAA it causes frame shift mutation. ( )
8. A carcinogen is a substance that induces unregulated growth processes in cells or tissues of multicellular animals. ( )
9. The genetic code is a sequence of amino acids in a tRNA that determine the amino acid order for the protein. ( )
10. For the initiation of protein synthesis a mRNA attaches to a ribosome. ( )
11. Frame shift mutation - An extra base adds to or is deleted from the normal DNA sequence. ( )
12. When one adenosine is removed from the DNA sequence, this is called substitution mutation. ( )
13. A Reverse transcription is process in which using viral RNA to synthesize viral DNA. ( )
14. DNA and RNA have a sugar-phosphate bond, made by phosphodiester linkages, and a sequence of any four nitrogenous bases that extend from it. ( )
15. The HIV-1 virus is a retrovirus that infects T4 lymphocyte cells. ( )
16. During transcription, RNA *polymerase* moves along the mRNA template to synthesize the corresponding DNA. ( )
17. During the protein synthesis, each mRNA bonds to a specific amino acid at the acceptor stem. ( )
18. The transfer RNA makes up 2/3 of ribosomes where protein synthesis takes place. ( )
19. The sugar-phosphate backbone of a nucleic acid is directional. ( )
20. The sequence of bases of RNA and DNA isn't always written in 5'-->3'. ( )
21. The role of tRNA during translation is to carry ribosomes to the site of protein synthesis. ( )
22. Purine-pyrimidine pairs allow hydrogen bonds to form between some purines and pyrimidines. ( )
23. DNA carries the information required for an organism's growth and reproduction. ( )
24. The DNA molecule is double stranded and the RNA molecule is single stranded. ( )
25. The job of mRNA is to pick up amino acids and transport them to the ribosomes. ( )
- 26- Transcription must occur before translation may occur. ( )



- 27- If a portion of a messenger RNA molecule contains the base sequence A-A-U, the corresponding transfer RNA base sequence is A-A-U. ( )
- 28- The process of translation occurs at the ribosome. ( )
- 29- The actual site of protein synthesis is the nucleus. ( )
- 30- A mutagen is a substance or agent that induces heritable change in cells or organisms. ( )

**B- Choose the correct answer for the following sentences:**

- Where is the (-OH) bonded to:  
a- 3' carbon.                      b- 1' carbon                      c- 4' carbon                      d- 5' carbon
- Which of the next are the purines?  
a- adenine and guanine. b- adenine and pyrimidine. c- cytosine, uracil, and thymine.
- Ribonucleotides are closely related to which atom?  
a- uracil.                      b- cytosine                      c- thymine                      d- adenine
- What are the pyrimidines?  
a- cytosine, uracil, and thymine. b- adenine and pyrimidine. c- adenine and guanine.
- Deoxyribonucleotides are closely related to which atom?  
a- uracil.                      b- cytosine                      c- thymine                      d- adenine.
- The genetic code consists of sets of..... bases (triplet) along the mRNA called codons:  
a- One.                      b- Two.                      c- Three.                      d- Four.
- the start codon (AUG) binds to a tRNA with .....  
a- Methionine.                      b- Glycine.                      c- Leucine.                      d- Alanine.
- Ribosomes move along mRNA adding amino acids to a growing peptide chain, this process is called:  
a- Activation. b- Termination. c- Initiation. d- Translocation.
- The sugar component is made up of what functional group?  
a-  $\text{NH}_2$                       b-  $\text{C=O}$ .                      c- OH.                      d-  $\text{COOH}$ .
- The phosphate is attached to which carbon:  
a- 5'.                      b- 1'.                      c- 4'.                      d- 3'.
- One similarity between DNA and messenger RNA molecules is that they both contain  
a. the same sugar                      b. genetic codes based on sequences of bases  
c. a nitrogenous base known as uracil                      d. double-stranded polymers
- Adenosine is type of .....  
a. Codons                      b. Nucleosides                      c. Nucleotides.
- Nucleosides is.....  
a. tRNA and mRNA                      b. Carbohydrate and base                      c. Phosphate and base
- Guanosine is type of .....  
a. Nitrogenous base                      b. Nucleosides                      c. Nucleotides
- ..... carries genetic information from DNA to the ribosome.  
a. tRNA                      b. mRNA                      c. rRNA.
- ..... brings amino acids to the ribosome to make the protein.  
a. rRNA                      b. mRNA                      c. tRNA.
- During ..... a section of DNA containing the gene unwinds.

- a. Translocation.                      b. Transcription                      c. Translation.
18. The genetic code is a sequence of ..... in a mRNA that determine the amino acid order for the protein.
- a. Amino acids                      b. bases.                      c. Nucleic acids
19. The effect of caffeine on brain is to:
- a- decreases dopamine level                      b- increases dopamine level  
c- keeps dopamine level to be constant                      d- None of them.
20. A tRNA attaches to its specific amino acid, the process is called.....
- a. Termination.                      b. Transcription                      c. Activation.
21. Which of the following is not part of protein synthesis?
- a. replication                      b. translation                      c. transcription
22. The codon is located on the .....
- a. mRNA.                      b. tRNA.                      c. rRNA.                      d. DNA.
23. In the RNA molecule, which nitrogen base is found in place of thymine?
- a. guanine                      b. cytosine                      c. thymine                      d. uracil
24. During the process of transcription, which of the following is produced?
- a. H<sub>2</sub>O                      b. ATP                      c. mRNA                      d. DNA
25. The actual site of protein synthesis is the
- a. nucleus.                      b. mitochondrion.                      c. chloroplast.                      d. ribosome.
26. If the DNA template reads "ATA", then which of the following would be the corresponding sequence on the mRNA?
- a. UAU                      b. ATA                      c. TUT                      d. UCU
27. Amino acids are held together by ..... bonds.
- a. hydrogen                      b. Peptide                      c. Ionic                      d. High energy
28. How many codons are needed to specify three amino acids?
- a. 3                      b. 9                      c. 6                      d. 12
29. The chemical name of caffeine is:
- a- 1,3,7-trimethylxanthine                      b- 1,2,7-trimethylxanthine                      c-1,3,6-trimethylxanthine
30. For the initiation of protein synthesis, mRNA attaches to .....
- a. Termination.                      b. Transcription                      c. Initiation.

**The oral Exam (10 marks)**

**A) Answer the following questions: (4marks)**

- a) Synthesis of sulfathiazole.
- b) What are the principles which should guide the chemist in his search for new chemotherapeutic agents

**B- Choose the correct answer for the following sentences: (3marks)**

1. What charge do phosphates have?  
a- Positive.                      b- Negative                      c- Neither negative nor positive.
2. Who discover the complementary base paring?  
a. Watson.                      b- Watson and Crick.                      c- Neither (a) nor (b).
3. How many hydrogen bonds form when A and T pair?  
a. 2.                      b- 4.                      c- 3.                      d- None of the above
4. Which one of the following nucleotide bases is not found in RNA?  
a. Adenine                      b. Thymine                      c. Guanine                      d. Cytosine

**C- Put (✓) for the correct statement and (×) for the wrong one: (3marks)**

1. RNA molecule contains Thymine base.
2. Adenosine is type of nucleotides.
3. Adenine is linked with thymine.
4. Retrovirus is a virus containing RNA.

Good Luck

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