

- (31) In the P-V isotherms of  $\text{CO}_2$ , it is possible to liquefy  $\text{CO}_2$  upon pressure increase at  $50^\circ\text{C}$ .
- (32) Dieterici equation for one mole of gas expressed as:  $P(V-b) = RT e^{-a/VRT}$ .
- (33) Boyle's temperature of a gas is the temperature at which the minimum in the Z-P curve vanishes and the curve remains horizontal.
- (34) If zinc and aluminium electrodes co-exist in an electrochemical cell, aluminium will act as cathode and zinc will act as an anode.
- (35) Copper sulfate can be stored in aluminium bottles.
- (36) Gas adsorption can be used in measuring the surface area of solids and for removing coloring matter from various other types of solutions.
- (37) Association colloids comprise two regions of opposing solution affinities within the same molecule.
- (38) In the  $\text{Cu}|\text{Cu}^{2+}||\text{Au}^{3+}|\text{Au}$  cell, electrons flow from gold electrode through the wire to the copper electrode.
- (39) The Freundlich adsorption equation is applicable only at low pressures.
- (40) Tyndall effect can visually distinguish a colloidal sol from a true solution.
- (41) The formal charge of N atom in  $\text{NO}_2^-$  ion = +1
- (42) In an antibonding molecular orbital, the nuclei are attracted to an accumulation of electron density outside the internuclear region.
- (43) The geometrical shape of  $\text{SO}_3$  molecule is T-shaped
- (44) The  $\text{B}_2$  molecule has diamagnetic properties.
- (45) For the fourth spectral emission line in Pfund series for H-atom;  $n_2 = 9$
- (46) The bond angle in  $\text{NH}_3$  molecule is smaller than that in  $\text{H}_2\text{O}$ .
- (47) The  $\text{H}_2\text{CO}$  molecule has 3 resonating structures.
- (48)  $\text{Ne}_2$  molecule does not exist.
- (49) The hybridization of C in  $\text{CO}_2$  molecule is  $\text{sp}^3$
- (50) The emission spectra consist of a series of dark lines superimposed on the continuous spectrum of the light source

(Atomic weights:  $\text{C} = 12$ ;  $\text{Cl} = 35.5$ ;  $\text{H} = 1$ ;  $\text{N} = 14$ ,  $\text{O} = 16$ ;  $\text{S} = 32$ )

(Atomic numbers:  $\text{H} = 1$ ,  $\text{B} = 5$ ,  $\text{C} = 6$ ,  $\text{N} = 7$ ,  $\text{O} = 8$ ,  $\text{F} = 9$ ,  $\text{Ne} = 10$ ,  $\text{S} = 16$  and  $\text{Cl} = 17$ )

(Standard electrode potentials:  $E^\circ_{\text{Cu}/\text{Cu}^{2+}} = +0.34 \text{ V}$ ;  $E^\circ_{\text{Zn}/\text{Zn}^{2+}} = -0.76 \text{ V}$ ;

$E^\circ_{\text{Au}/\text{Au}^{3+}} = +1.50 \text{ V}$ ;  $E^\circ_{\text{Al}/\text{Al}^{3+}} = -1.66 \text{ V}$ )

---

Examiners: Prof. Bahaa M. Abu-Zied, Dr. Soliman A. Soliman

GOOD LUCK

- (11) The splitting of a spectral line into several components in the presence of a static magnetic field is called ..... effect.  
 (A) Compton (B) Photoelectric (C) Zeeman (D) Bohr
- (12) The bond in HF molecule is .....  
 (A) ionic (B) non-polar covalent (C) polar covalent (D) dative
- (13) ..... deduced that "it is not possible to determine with accuracy both the position and the velocity of an electron at the same time"  
 (A) Heisenberg (B) de Broglie (C) Plank (D) Pauli
- (14) The magnetic quantum number ( $m_l$ ) describes the orbital's .....  
 (A) size (B) shape (C) energy (D) orientation in the space
- (15) The  $\text{NO}_2^-$  ion has ..... resonating structures.  
 (A) 0 (B) 1 (C) 2 (D) 3
- (16) The number of nonbonding electron pairs on Cl atom in  $\text{ClF}_3$  molecule = .....  
 (A) 1 (B) 2 (C) 3 (D) 4
- (17) The molecular geometry of  $\text{ClF}_3$  molecule is .....  
 (A) trigonal planar (B) trigonalpyramidal (C) tetrahedral (D) T-shaped
- (18) The bond order in the  $\text{C}_2$  molecule = .....  
 (A) 1 (B) 2 (C) 3 (D) 4
- (19) The total number of electron pairs on the S atom in the  $\text{SF}_4$  molecule = .....  
 (A) 3 (B) 4 (C) 5 (D) 6
- (20) The geometrical shape of  $\text{SF}_4$  molecule is .....  
 (A) square planar (B) trigonal bipyramidal (C) seesaw (D) tetrahedral
- (21) The highest energy electrons in the  $\text{N}_2$  molecule occupy the ..... orbital.  
 (A)  $\sigma$  (B)  $\sigma^*$  (C)  $\pi$  (D)  $\pi^*$
- (22) The electron domain geometry of  $\text{NO}_2^-$  ion is .....  
 (A) tetrahedral (B) trigonal planar  
 (C) trigonal bipyramidal (D) linear
- (23) Molecules with trigonal bipyramidal geometry have ..... Hybrid orbitals  
 (A)  $\text{sp}^2$  (B)  $\text{sp}^3$  (C)  $\text{sp}^3\text{d}$  (D)  $\text{sp}^3\text{d}^2$
- (24) The formal charge of S atom in  $\text{SO}_3$  molecule = .....  
 (A) -1 (B) +1 (C) -2 (D) +2
- (25) The bond order in the  $\text{O}_2^+$  ion is .....  
 (A) 1 (B) 1.5 (C) 2 (D) 2.5

**Q2: Answer (T) for true sentences or (F) for False sentences: (One mark for each)**

- (26) At atmospheric pressure  $> 1$  atm, water boils at temperatures  $< 100^\circ\text{C}$ .
- (27) The average kinetic energy of the gas molecules is inversely proportional to absolute temperature.
- (28) The viscosity of a liquid decreases with an increase in the temperature.
- (29) The Van der Waal's constants "a" and "b" are different for different gases.
- (30) True solids are anisotropic substances while amorphous solids are isotropic ones.

Please turn over for the rest of questions



Assiut University  
Faculty of Science  
Chemistry Department



14<sup>th</sup> May 2025  
Time allowed: 2 h

Second Semester Examination  
Subject: General Chemistry (C-100)  
Students: First Level "Credit Hours System"

**Q1: Choose the correct answer A, B, C, or D in the following sentences: (One mark for each)**

- (1) The density of a gas is 3.48 g/L at STP, what is its molecular mass? ( $R = 0.0821 \text{ L atm mol}^{-1} \text{ K}^{-1}$ )  
(A) 44.606 g/mole (B) 77.998 g/mole  
(C) 32.055 g/mole (D) 147.112 g/mole
- (2) A sol is prepared by adding  $\text{Fe}(\text{NO}_3)_3$  solution to an excess of  $\text{NH}_4\text{OH}$  solution. The charge likely to develop on colloidal particles is .....  
(A) positive (B) negative (C) both charges (D) no charge
- (3) For a gas, which pairs of variables are inversely proportional to each other if all other conditions remain constant)?  
(A) P, T (B) V, T (C) P, V (D) n, V
- (4) The order of diffusion of  $\text{NH}_3$ ,  $\text{SO}_2$ ,  $\text{Cl}_2$ , and  $\text{CO}_2$  gases is:  
(A)  $\text{NH}_3 > \text{SO}_2 > \text{Cl}_2 > \text{CO}_2$  (B)  $\text{NH}_3 > \text{CO}_2 > \text{SO}_2 > \text{Cl}_2$   
(C)  $\text{Cl}_2 > \text{SO}_2 > \text{CO}_2 > \text{NH}_3$  (D) None of these
- (5) Which of the following liquids has the highest viscosity?  
(A) Water (B) Ethyl alcohol (C) Acetone (D) Glycerin
- (6) Select the correct cell reaction of the cell:  $\text{Cu(s)} | \text{Cu}^{2+}(\text{aq}) || \text{Ag}^+(\text{aq}) | \text{Ag(s)}$   
(A)  $2\text{Ag}_{(\text{s})} + \text{Cu}_{(\text{s})} \rightarrow \text{Cu}^{2+}_{(\text{aq})} + 2\text{Ag}^{+}_{(\text{aq})}$   
(B)  $\text{Cu}_{(\text{s})} + 2\text{Ag}^{+}_{(\text{aq})} \rightarrow \text{Cu}^{2+}_{(\text{aq})} + 2\text{Ag}_{(\text{s})}$   
(C)  $2\text{Ag}_{(\text{s})} + \text{Cu}^{2+}_{(\text{aq})} \rightarrow \text{Cu}_{(\text{s})} + 2\text{Ag}^{+}_{(\text{aq})}$   
(D)  $\text{Cu}^{2+}_{(\text{aq})} + 2\text{Ag}^{+}_{(\text{aq})} \rightarrow 2\text{Ag}_{(\text{s})} + \text{Cu}_{(\text{s})}$
- (7) The potential of the cell made up of  $\text{Zn/Zn}^{2+}(0.25 \text{ M})$  and  $\text{Cu/Cu}^{2+}(0.25 \text{ M})$  at 25 °C is .....  
(A) 1.39 V (B) 2.09 V (C) 1.10 V (D) 1.49
- (8) Water vapor can be absorbed by .....  
(A) silica (B) alumina  
(C) charcoal (D) anhydrous calcium chloride
- (9) The dialysis process can be accelerated by:  
(A) applying a magnetic field (B) temperature lowering  
(C) irradiation with infrared light (D) applying an electric field
- (10) The compressibility factor for a real gas at high pressure is .....  
(A) 1.0 (B)  $1 + (\text{Pb}/\text{RT})$   
(C)  $1 - (\text{Pb}/\text{RT})$  (D)  $1 + (\text{RT}/\text{Pb})$

Please turn over for the rest of questions



- C) increasing the temperature  
D) concentration of common ion that considerably exceeds that of the target ion
- 37- In the Brønsted–Lowry definition of acids and bases, a base .....
- A) is a proton donor.                      B) is a proton acceptor  
C) is an electron donor                  D) breaks stable hydrogen bonds
- 38- The boiling point of chloroform was raised by 0.323°C when 1.0286 g of a substance was dissolved in 70 g of it. Given that,  $K_b$  for chloroform is 3.9 °C /mol, the molecular weight of this substance is
- A) 177.4 g/mol                                  B) 277.4 g/mol  
C) 188.3 g/mol                                  D) 388.4 g/mol
- 39- Consider the equilibrium:  $2\text{HI}_{(g)} + \text{S}_{(s)} \rightleftharpoons \text{H}_2\text{S}_{(g)} + \text{I}_{2(s)}$ ; which of the following relations is correct?
- A)  $K_c = [\text{S}] [\text{HI}]^2 / [\text{H}_2\text{S}] [\text{I}_2]$                       B)  $K_c = [\text{HI}]^2 / [\text{H}_2\text{S}] [\text{S}]$   
C)  $K_c = [\text{HI}]^2 / [\text{H}_2\text{S}] [\text{I}_2]$                       D)  $K_c = [\text{H}_2\text{S}] / [\text{HI}]^2$
- 40-  $K_{sp}$  of AgCl is  $2.8 \times 10^{-10}$  at 25°C. Its solubility in 1.0 M AgNO<sub>3</sub> will be:
- A)  $2.8 \times 10^{-9}$  mole/liter                      B)  $2.8 \times 10^{-10}$  mole/liter  
C)  $3.2 \times 10^{-9}$  mole/liter                      D)  $3.2 \times 10^{-12}$  mole/liter

Q3: Answer (T) for True sentences Or (F) for False sentences: (1 Mark for each)

- 41- Raising the temperature of an exothermic reaction shifts the equilibrium to the right side.
- 42- Solubility increases with an increase in temperature if the solution process is endothermic.
- 43- In the equilibrium:  $\text{H}_{2(g)} + \text{I}_{2(g)} \rightleftharpoons 2\text{HI}_{(g)}$  ( $\Delta H = +53 \text{ kJ mol}^{-1}$ ), both  $K_c$  and  $K_p$  have the same value.
- 44- The vapor pressure of diluted aqueous sucrose solution is higher than that of pure water.
- 45- The pOH of a 0.10 M solution of barium hydroxide is lower than that of 0.10 M NaOH solution.
- 46- If the reaction quotient ( $Q$ ) is less than  $K_c$ , then the reverse reaction must occur to reach equilibrium.
- 47- Group II and group IV sulfides can be precipitated in alkaline medium.
- 48- A solution consists of 0.1 M of each NH<sub>4</sub>Cl and NH<sub>4</sub>OH resist changes in its pH value when limited amounts of strong acid or strong base are added to it.
- 49- The solubility of calcium oxalate increases as the pH is lowered.
- 50- The pH of CH<sub>3</sub>COONa solution is given by:  $\text{pH} = \frac{1}{2} \text{pK}_w - \frac{1}{2} \text{pK}_a - \frac{1}{2} \log C_{\text{salt}}$ .

---

Examiners: Prof. Ali A. Abdel-Hafez, Prof. Ragaa Ahmed, Prof. Bahaa M. Abu-Zied, Dr. Ahmed A. Omar, Dr. Soliman A. Soliman

GOOD LUCK



Section (B): Analytical Chemistry

Q2. Shade the correct answer; A, B, C or D; (1 Mark each)

- 26- In a reversible chemical reaction at equilibrium, if the concentration of any one of the reactants is halved at the same temperature, then the equilibrium constant will .....
- A) also be doubled                      B) be halved  
C) remain the same                      D) become one-fourth
- 27- Given that  $K_a$  of  $\text{CH}_3\text{COOH} = 1.8 \times 10^{-5}$  and  $K_w = 1 \times 10^{-14}$ , the pOH of a 1.00 M  $\text{CH}_3\text{COONa}_{(\text{aq})}$  equals:
- A) 7.0                      B) 4.63                      C) 9.37                      D) 11.00
- 28- Increasing the volume on the equilibria,  $\text{H}_2\text{S}_{(\text{g})} + \text{I}_{2(\text{s})} \rightleftharpoons 2 \text{HI}_{(\text{g})} + \text{S}_{(\text{s})}$ , at constant temperature:
- A) shifts the equilibria to the right direction  
B) increases  $\text{H}_2\text{S}$  concentration  
C) shifts the equilibria to the left direction  
D) has no effect
- 29- The concentration of dihydrogen phosphate ion in 1 M  $\text{H}_3\text{PO}_4$  solution is: ( $K_{a1} = 7.1 \times 10^{-3}$ ,  $K_{a2} = 6.3 \times 10^{-8}$ ,  $K_{a3} = 4.3 \times 10^{-13}$ )
- A) 0.50 M                      B) 2.00 M                      C) 0.084 M                      D) 1.00 M
- 30- The pH of a 1.00 M  $\text{H}_2\text{SO}_{4(\text{aq})}$  equals: ( $K_{a1} \approx 1 \times 10^3$ ,  $K_{a2} = 1.1 \times 10^{-2}$ )
- A) 7.0                      B) 4.63                      C) 9.77                      D) 0.00
- 31- In which of the following aqueous solutions will the molar solubility of  $\text{Mg}(\text{OH})_2$  ( $K_{sp} = 1.8 \times 10^{-11}$ ) be greatest? ( $K_b$  of  $\text{NH}_4\text{OH} = 1.8 \times 10^{-5}$  and  $K_w = 1 \times 10^{-14}$ )
- A) 1.00 M  $\text{NH}_3$                       B) 1.00 M  $\text{NH}_3$  - 1.00 M  $\text{NH}_4\text{Cl}$   
C) 1.00 M  $\text{NH}_4\text{Cl}$                       D) 1.00 M  $\text{NaOH}$
- 32- Which of the following is a colligative property of a dilute urea solution?
- A) boiling point depression                      B) vapor pressure elevation  
C) freezing point elevation                      D) osmotic pressure
- 33- For the reaction:  $\text{CO}_{(\text{g})} + \text{Cl}_{2(\text{g})} \rightleftharpoons \text{COCl}_{2(\text{g})}$ , the value of  $K_c/K_p$  is equal to:
- A)  $(RT)^2$                       B)  $RT$                       C)  $1/(RT)$                       D) 1.0
- 34- When a salt of weak acid and weak base is dissolved in water at 25 °C, the pH of the resulting solution will:
- A) depend on  $K_a$  only                      B) depend on  $K_b$  only  
C) independent on  $K_a$  and  $K_b$                       D) none of these
- 35- At a certain temperature, only 50% HI is dissociated at equilibrium in the following reaction:  $2\text{HI}_{(\text{g})} \rightleftharpoons \text{H}_{2(\text{g})} + \text{I}_{2(\text{g})}$ , the equilibrium constant for this reaction equals:
- A) 0.25                      B) 1.0                      C) 3.0                      D) 0.5
- 36- Which of the following conditions will not favor the completeness of precipitation?
- A) very small  $K_{sp}$  value  
B) high initial ion concentrations

Please turn over for the rest of questions

- C) Cyclohexane, cyclopentane, cyclohexane, D) None
- 10- The increasing order of unsaturation is:  
 A) Alkyne, alkane, alkene; B) Alkane, alkyne, alkene,  
 C) Alkane, alkene, alkyne, D) None
- 11- Which of the following alkenes exhibit cis - trans isomerism:  
 A)  $\text{CH}_3\text{CH}_2\text{CHCH}_2$ , B)  $\text{CH}_3\text{CHCHCH}_2\text{Cl}_2$ ,  
 C)  $\text{CH}_3\text{CHCHCH}_3$ , D)  $(\text{CH}_3)_2\text{CHCHC}(\text{CH}_3)_2$
- 12- The correct order of increasing energy of the following orbitals:  
 A) S, SP,  $\text{SP}^2$ ,  $\text{SP}^3$ , P; B) S, P,  $\text{SP}^2$ ,  $\text{SP}^3$ , SP;  
 C) S,  $\text{SP}^3$ , SP,  $\text{SP}^2$ , P D) S,  $\text{SP}^3$ ,  $\text{SP}^2$ , SP, P
- 13- The decreasing order of b.p. of the following alkanes is:  
 A) Pentane, neopentane, isopentane ;  
 B) Isopentane, pentane, neopentane ;  
 C) Pentane, isopentane, neopentane ; D) None
- 14- The number of isomers of  $\text{C}_4\text{H}_8$  is:  
 A) 2, B) 3, C) 4, D) None
- 15- Ethene and ethyne are examples for:  
 A) chain isomerism; B) positional isomerism;  
 C) functional isomerism; D) None
- 16- The correct order of increasing angle between the hybrid orbitals are:  
 A)  $\text{SP}^3$ , SP,  $\text{SP}^2$ ; B)  $\text{SP}^2$ ,  $\text{SP}^3$ , SP;  
 C)  $\text{SP}^3$ ,  $\text{SP}^2$ , SP; D) SP,  $\text{SP}^2$ ,  $\text{SP}^3$
- 17- The correct order of increasing C-H bond length is:  
 A)  $\text{SP}^3\text{-H}$ , SP-H,  $\text{SP}^2\text{-H}$ ; B)  $\text{SP}^3\text{-H}$ ,  $\text{SP}^2\text{-H}$ , SP-H;  
 C) SP-H,  $\text{SP}^3\text{-H}$ ,  $\text{SP}^2\text{-H}$ ; D) SP-H,  $\text{SP}^2\text{-H}$ ,  $\text{SP}^3\text{-H}$
- 18- The reaction of 1- butyne with ethyl iodide in sodamide gave:  
 A) Iodoheptane, B) Iodoheptene,  
 C) Iodoheptyne, D) None
- 19- The great percent of P- character is in:  
 A) ethene, B) ethyne, C) Ethane, D) None
- 20- An organic compound changes the permanganate colour, the compound is:  
 A) Alkane , B) Isoalkane, C) Cycloalkane, D) Alkene
- 21- Methylacetate is an isomer of:  
 A) Formamide ; B) Acetic acid;  
 C) Formic acid; D) Propionic acid
- 22- What could be the name of compound that has the general formula  $\text{RCONH}_2$ :  
 A) Acid, B) Amine, C) Ester, D) None
- 23- The reaction of  $\text{CH}_3\text{CCCH}_3$  with  $2\text{H}(\text{Ni})$  gave:  
 A) cis - butene; B) trans - butene; C) butanol; D) butane
- 24- The reaction of propyne with ethyl iodide in presence of sod amide gave:  
 A) Propene; B) iodopropene; C) iodopropane; D) 2- pentyne
- 25-  $\text{RSO}_2\text{R}$  ( R= alkyl ) is called:  
 A) dialkylthiol, B) dialkylsulphone,  
 C) dialkylsulphate, D) dialkylsulphide

Please turn over for the rest of questions





Assiut University  
Faculty of Science  
Department of Chemistry



Date: 14<sup>th</sup> May 2025  
Time allowed: 2 hours

Final Examination of General Chemistry (2) (C-105) for 1<sup>st</sup> level students

يتم طمس (تسويد) الإجابة المختارة من قبل الطالب باستخدام القلم الجاف فقط

Answer the following questions:

Section A; Organic Chemistry (25 Marks)

Q1- Shade the correct answer A,B,C or D (1 Mark each)

1- Lewis structure is the diagram that shows:

- A) Sigma bond between atoms,      B) Pi bond between atoms,  
C) Triple bond between atoms,      D) None.

2- Reaction of 2- butyne using Landlers catalyst gave:

- A) Bromopropane,      B) Bromopropene,  
C) 2- Bromopropene,      D) None

3- The IUPAC name of  $(CH_3)_2CCH(CH_2)_2C(CH_3)CHCH_2OH$ :

- A) 3,7-dimethylocta-2,7-diene-1-ol,  
B) 2,6-dimethylocta-2,6-diene-8-ol,  
C) 3,7-dimethylocta-2,6-diene-1-ol  
D) 2,6-dimethylocta-3,7-diene-8-ol

4- Ozonolysis of an alkene gave acetaldehyde and 2- butanone so, the alkene is :

- A) 1- Butene,      B) 2- Butene,  
C) 2- Methyl -2- butene,      D) None

5- Which of the following compounds is relatively acidic:

- A)  $CH_3CHCH_2$       B)  $C_2H_4$ ,  
C)  $CH_3CCH$ ,      D)  $C_2H_2$

6- Reaction of cyclopentene with alkaline  $KMnO_4$  gave:

- A) Cyclopentene,      B) Cyclopentanol,  
C) Cyclopentanone,      D) None

7- The aromatic ring of the following is:

- A) Cyclohexane,      B) Cyclohexene,  
C) 1,4- Cyclohexadiene,      D) None

8- Allyl alcohol is:

- A)  $CH_3(CH_2)_2OH$ ,      B)  $CHCCH_2OH$ ,  
C)  $CH_3CHCHOH$ ,      D) None

9- The order of increasing b.p.of cycloalkanes is:

- A) Cycloheptane, cyclopentane, cyclohexane  
B) Cyclopentane, cyclohexane, cycloheptane

Please turn over for the rest of questions

- C) increasing the temperature  
D) concentration of common ion that considerably exceeds that of the target ion
- 37- In the Brønsted–Lowry definition of acids and bases, a base .....
- A) is a proton donor.                      B) is a proton acceptor  
C) is an electron donor                  D) breaks stable hydrogen bonds
- 38- The boiling point of chloroform was raised by 0.323°C when 1.0286 g of a substance was dissolved in 70 g of it. Given that,  $K_b$  for chloroform is 3.9 °C /mol, the molecular weight of this substance is
- A) 177.4 g/mol                                  B) 277.4 g/mol  
C) 188.3 g/mol                                  D) 388.4 g/mol
- 39- Consider the equilibrium:  $2\text{HI}_{(g)} + \text{S}_{(s)} \rightleftharpoons \text{H}_2\text{S}_{(g)} + \text{I}_{2(s)}$ ; which of the following relations is correct?
- A)  $K_c = [\text{S}] [\text{HI}]^2 / [\text{H}_2\text{S}] [\text{I}_2]$                       B)  $K_c = [\text{HI}]^2 / [\text{H}_2\text{S}] [\text{S}]$   
C)  $K_c = [\text{HI}]^2 / [\text{H}_2\text{S}] [\text{I}_2]$                       D)  $K_c = [\text{H}_2\text{S}] / [\text{HI}]^2$
- 40-  $K_{sp}$  of AgCl is  $2.8 \times 10^{-10}$  at 25°C. Its solubility in 1.0 M AgNO<sub>3</sub> will be:
- A)  $2.8 \times 10^{-9}$  mole/liter                      B)  $2.8 \times 10^{-10}$  mole/liter  
C)  $3.2 \times 10^{-9}$  mole/liter                      D)  $3.2 \times 10^{-12}$  mole/liter

Q3: Answer (T) for True sentences Or (F) for False sentences: (1 Mark for each)

- 41- Raising the temperature of an exothermic reaction shifts the equilibrium to the right side.
- 42- Solubility increases with an increase in temperature if the solution process is endothermic.
- 43- In the equilibrium:  $\text{H}_{2(g)} + \text{I}_{2(g)} \rightleftharpoons 2\text{HI}_{(g)}$  ( $\Delta H = +53 \text{ kJ mol}^{-1}$ ), both  $K_c$  and  $K_p$  have the same value.
- 44- The vapor pressure of diluted aqueous sucrose solution is higher than that of pure water.
- 45- The pOH of a 0.10 M solution of barium hydroxide is lower than that of 0.10 M NaOH solution.
- 46- If the reaction quotient ( $Q$ ) is less than  $K_c$ , then the reverse reaction must occur to reach equilibrium.
- 47- Group II and group IV sulfides can be precipitated in alkaline medium.
- 48- A solution consists of 0.1 M of each NH<sub>4</sub>Cl and NH<sub>4</sub>OH resist changes in its pH value when limited amounts of strong acid or strong base are added to it.
- 49- The solubility of calcium oxalate increases as the pH is lowered.
- 50- The pH of CH<sub>3</sub>COONa solution is given by:  $\text{pH} = \frac{1}{2} \text{pK}_w - \frac{1}{2} \text{pK}_a - \frac{1}{2} \log C_{\text{salt}}$ .

Examiners: Prof. Ali A. Abdel-Hafez, Prof. Ragaa Ahmed, Prof. Bahaa M. Abu-Zied, Dr. Ahmed A. Omar, Dr. Soliman A. Soliman

GOOD LUCK



Section (B): Analytical Chemistry

Q2. Shade the correct answer; A, B, C or D; (1 Mark each)

- 26- In a reversible chemical reaction at equilibrium, if the concentration of any one of the reactants is halved at the same temperature, then the equilibrium constant will .....
- A) also be doubled                      B) be halved  
C) remain the same                      D) become one-fourth
- 27- Given that  $K_a$  of  $\text{CH}_3\text{COOH} = 1.8 \times 10^{-5}$  and  $K_w = 1 \times 10^{-14}$ , the pOH of a 1.00 M  $\text{CH}_3\text{COONa}_{(\text{aq})}$  equals:
- A) 7.0                      B) 4.63                      C) 9.37                      D) 11.00
- 28- Increasing the volume on the equilibria,  $\text{H}_2\text{S}_{(\text{g})} + \text{I}_{2(\text{s})} \rightleftharpoons 2 \text{HI}_{(\text{g})} + \text{S}_{(\text{s})}$ , at constant temperature:
- A) shifts the equilibria to the right direction  
B) increases  $\text{H}_2\text{S}$  concentration  
C) shifts the equilibria to the left direction  
D) has no effect
- 29- The concentration of dihydrogen phosphate ion in 1 M  $\text{H}_3\text{PO}_4$  solution is: ( $K_{a1} = 7.1 \times 10^{-3}$ ,  $K_{a2} = 6.3 \times 10^{-8}$ ,  $K_{a3} = 4.3 \times 10^{-13}$ )
- A) 0.50 M                      B) 2.00 M                      C) 0.084 M                      D) 1.00 M
- 30- The pH of a 1.00 M  $\text{H}_2\text{SO}_4_{(\text{aq})}$  equals: ( $K_{a1} \approx 1 \times 10^3$ ,  $K_{a2} = 1.1 \times 10^{-2}$ )
- A) 7.0                      B) 4.63                      C) 9.77                      D) 0.00
- 31- In which of the following aqueous solutions will the molar solubility of  $\text{Mg}(\text{OH})_2$  ( $K_{sp} = 1.8 \times 10^{-11}$ ) be greatest? ( $K_b$  of  $\text{NH}_4\text{OH} = 1.8 \times 10^{-5}$  and  $K_w = 1 \times 10^{-14}$ )
- A) 1.00 M  $\text{NH}_3$                       B) 1.00 M  $\text{NH}_3$  - 1.00 M  $\text{NH}_4\text{Cl}$   
C) 1.00 M  $\text{NH}_4\text{Cl}$                       D) 1.00 M  $\text{NaOH}$
- 32- Which of the following is a colligative property of a dilute urea solution?
- A) boiling point depression                      B) vapor pressure elevation  
C) freezing point elevation                      D) osmotic pressure
- 33- For the reaction:  $\text{CO}_{(\text{g})} + \text{Cl}_{2(\text{g})} \rightleftharpoons \text{COCl}_{2(\text{g})}$ , the value of  $K_c/K_p$  is equal to:
- A)  $(RT)^2$                       B)  $RT$                       C)  $1/(RT)$                       D) 1.0
- 34- When a salt of weak acid and weak base is dissolved in water at 25 °C, the pH of the resulting solution will:
- A) depend on  $K_a$  only                      B) depend on  $K_b$  only  
C) independent on  $K_a$  and  $K_b$                       D) none of these
- 35- At a certain temperature, only 50% HI is dissociated at equilibrium in the following reaction:  $2\text{HI}_{(\text{g})} \rightleftharpoons \text{H}_{2(\text{g})} + \text{I}_{2(\text{g})}$ , the equilibrium constant for this reaction equals:
- A) 0.25                      B) 1.0                      C) 3.0                      D) 0.5
- 36- Which of the following conditions will not favor the completeness of precipitation?
- A) very small  $K_{sp}$  value  
B) high initial ion concentrations

Please turn over for the rest of questions

- C) Cyclohexane, cyclopentane, cyclohexane, D) None
- 10- The increasing order of unsaturation is:  
 A) Alkyne, alkane, alkene; B) Alkane, alkyne, alkene,  
 C) Alkane, alkene, alkyne, D) None
- 11- Which of the following alkenes exhibit cis - trans isomerism:  
 A)  $\text{CH}_3\text{CH}_2\text{CHCH}_2$ , B)  $\text{CH}_3\text{CHCHCH}_2\text{Cl}_2$ ,  
 C)  $\text{CH}_3\text{CHCHCH}_3$ , D)  $(\text{CH}_3)_2\text{CHCHC}(\text{CH}_3)_2$
- 12- The correct order of increasing energy of the following orbitals:  
 A) S,  $\text{SP}$ ,  $\text{SP}^2$ ,  $\text{SP}^3$ , P; B) S, P,  $\text{SP}^2$ ,  $\text{SP}^3$ ,  $\text{SP}$ ;  
 C) S,  $\text{SP}^3$ ,  $\text{SP}$ ,  $\text{SP}^2$ , P D) S,  $\text{SP}^3$ ,  $\text{SP}^2$ ,  $\text{SP}$ , P
- 13- The decreasing order of b.p. of the following alkanes is:  
 A) Pentane, neopentane, isopentane ;  
 B) Isopentane, pentane, neopentane ;  
 C) Pentane, isopentane, neopentane ; D) None
- 14- The number of isomers of  $\text{C}_4\text{H}_8$  is:  
 A) 2, B) 3, C) 4, D) None
- 15- Ethene and ethyne are examples for:  
 A) chain isomerism; B) positional isomerism;  
 C) functional isomerism; D) None
- 16- The correct order of increasing angle between the hybrid orbitals are:  
 A)  $\text{SP}^3$ ,  $\text{SP}$ ,  $\text{SP}^2$ ; B)  $\text{SP}^2$ ,  $\text{SP}^3$ ,  $\text{SP}$ ;  
 C)  $\text{SP}^3$ ,  $\text{SP}^2$ ,  $\text{SP}$ ; D)  $\text{SP}$ ,  $\text{SP}^2$ ,  $\text{SP}^3$
- 17- The correct order of increasing C-H bond length is:  
 A)  $\text{SP}^3\text{-H}$ ,  $\text{SP-H}$ ,  $\text{SP}^2\text{-H}$ ; B)  $\text{SP}^3\text{-H}$ ,  $\text{SP}^2\text{-H}$ ,  $\text{SP-H}$ ;  
 C)  $\text{SP-H}$ ,  $\text{SP}^3\text{-H}$ ,  $\text{SP}^2\text{-H}$ ; D)  $\text{SP-H}$ ,  $\text{SP}^2\text{-H}$ ,  $\text{SP}^3\text{-H}$
- 18- The reaction of 1- butyne with ethyl iodide in sodamide gave:  
 A) Iodoheptane, B) Iodoheptene,  
 C) Iodoheptyne, D) None
- 19- The great percent of P- character is in:  
 A) ethene, B) ethyne, C) Ethane, D) None
- 20- An organic compound changes the permanganate colour, the compound is:  
 A) Alkane, B) Isoalkane, C) Cycloalkane, D) Alkene
- 21- Methylacetate is an isomer of:  
 A) Formamide; B) Acetic acid;  
 C) Formic acid; D) Propionic acid
- 22- What could be the name of compound that has the general formula  $\text{RCONH}_2$ :  
 A) Acid, B) Amine, C) Ester, D) None
- 23- The reaction of  $\text{CH}_3\text{CCCH}_3$  with  $2\text{H}(\text{Ni})$  gave:  
 A) cis - butene; B) trans - butene; C) butanol; D) butane
- 24- The reaction of propyne with ethyl iodide in presence of sod amide gave:  
 A) Propene; B) iodopropene; C) iodopropane; D) 2- pentyne
- 25-  $\text{RSO}_2\text{R}$  (R= alkyl) is called:  
 A) dialkylthiol, B) dialkylsulphone,  
 C) dialkylsulphate, D) dialkylsulphide

Please turn over for the rest of questions





Assiut University  
Faculty of Science  
Department of Chemistry



Date: 14<sup>th</sup> May 2025  
Time allowed: 2 hours

Final Examination of General Chemistry (2) (C-105) for 1<sup>st</sup> level students

يتم طمس (تسويد) الإجابة المختارة من قبل الطالب باستخدام القلم الجاف فقط

Answer the following questions:

Section A: Organic Chemistry (25 Marks)

Q1- Shade the correct answer A,B,C or D (1 Mark each)

1- Lewis structure is the diagram that shows:

- A) Sigma bond between atoms, B) Pi bond between atoms,  
C) Triple bond between atoms, D) None.

2- Reaction of 2- butyne using Landlers catalyst gave:

- A) Bromopropane, B) Bromopropene,  
C) 2- Bromopropene, D) None

3- The IUPAC name of  $(\text{CH}_3)_2\text{CCH}(\text{CH}_2)_2\text{C}(\text{CH}_3)\text{CHCH}_2\text{OH}$ :

- A) 3,7-dimethylocta-2,7-diene-1-ol,  
B) 2,6-dimethylocta-2,6-diene-8-ol,  
C) 3,7-dimethylocta-2,6-diene-1-ol  
D) 2,6-dimethylocta-3,7-diene-8-ol

4- Ozonolysis of an alkene gave acetaldehyde and 2- butanone so, the alkene is :

- A) 1- Butene, B) 2- Butene,  
C) 2- Methyl -2- butene, D) None

5- Which of the following compounds is relatively acidic:

- A)  $\text{CH}_3\text{CHCH}_2$  B)  $\text{C}_2\text{H}_4$ ,  
C)  $\text{CH}_3\text{CCH}$ , D)  $\text{C}_2\text{H}_2$

6- Reaction of cyclopentene with alkaline  $\text{KMnO}_4$  gave:

- A) Cyclopentene, B) Cyclopentanol,  
C) Cyclopentanone, D) None

7- The aromatic ring of the following is:

- A) Cyclohexane, B) Cyclohexene,  
C) 1,4- Cyclohexadiene, D) None

8- Allyl alcohol is:

- A)  $\text{CH}_3(\text{CH}_2)_2\text{OH}$ , B)  $\text{CHCCH}_2\text{OH}$ ,  
C)  $\text{CH}_3\text{CHCHOH}$ , D) None

9- The order of increasing b.p.of cycloalkanes is:

- A) Cycloheptane, cyclopentane, cyclohexane  
B) Cyclopentane, cyclohexane, cycloheptane

Please turn over for the rest of questions

- (31) In the P-V isotherms of  $\text{CO}_2$ , it is possible to liquefy  $\text{CO}_2$  upon pressure increase at  $50^\circ\text{C}$ .
- (32) Dieterici equation for one mole of gas expressed as:  $P(V-b) = RT e^{-a/VRT}$ .
- (33) Boyle's temperature of a gas is the temperature at which the minimum in the Z-P curve vanishes and the curve remains horizontal.
- (34) If zinc and aluminium electrodes co-exist in an electrochemical cell, aluminium will act as cathode and zinc will act as an anode.
- (35) Copper sulfate can be stored in aluminium bottles.
- (36) Gas adsorption can be used in measuring the surface area of solids and for removing coloring matter from various other types of solutions.
- (37) Association colloids comprise two regions of opposing solution affinities within the same molecule.
- (38) In the  $\text{Cu}|\text{Cu}^{2+}||\text{Au}^{3+}|\text{Au}$  cell, electrons flow from gold electrode through the wire to the copper electrode.
- (39) The Freundlich adsorption equation is applicable only at low pressures.
- (40) Tyndall effect can visually distinguish a colloidal sol from a true solution.
- (41) The formal charge of N atom in  $\text{NO}_2^-$  ion = +1
- (42) In an antibonding molecular orbital, the nuclei are attracted to an accumulation of electron density outside the internuclear region.
- (43) The geometrical shape of  $\text{SO}_3$  molecule is T-shaped
- (44) The  $\text{B}_2$  molecule has diamagnetic properties.
- (45) For the fourth spectral emission line in Pfund series for H-atom;  $n_2 = 9$
- (46) The bond angle in  $\text{NH}_3$  molecule is smaller than that in  $\text{H}_2\text{O}$ .
- (47) The  $\text{H}_2\text{CO}$  molecule has 3 resonating structures.
- (48)  $\text{Ne}_2$  molecule does not exist.
- (49) The hybridization of C in  $\text{CO}_2$  molecule is  $\text{sp}^3$
- (50) The emission spectra consist of a series of dark lines superimposed on the continuous spectrum of the light source

(Atomic weights:  $\text{C} = 12$ ;  $\text{Cl} = 35.5$ ;  $\text{H} = 1$ ;  $\text{N} = 14$ ,  $\text{O} = 16$ ;  $\text{S} = 32$ )

(Atomic numbers:  $\text{H} = 1$ ,  $\text{B} = 5$ ,  $\text{C} = 6$ ,  $\text{N} = 7$ ,  $\text{O} = 8$ ,  $\text{F} = 9$ ,  $\text{Ne} = 10$ ,  $\text{S} = 16$  and  $\text{Cl} = 17$ )

(Standard electrode potentials:  $E^\circ_{\text{Cu}/\text{Cu}^{2+}} = +0.34 \text{ V}$ ;  $E^\circ_{\text{Zn}/\text{Zn}^{2+}} = -0.76 \text{ V}$ ;

$E^\circ_{\text{Au}/\text{Au}^{3+}} = +1.50 \text{ V}$ ;  $E^\circ_{\text{Al}/\text{Al}^{3+}} = -1.66 \text{ V}$ )

---

Examiners: Prof. Bahaa M. Abu-Zied, Dr. Soliman A. Soliman

GOOD LUCK



- (11) The splitting of a spectral line into several components in the presence of a static magnetic field is called ..... effect.  
 (A) Compton (B) Photoelectric (C) Zeeman (D) Bohr
- (12) The bond in HF molecule is .....  
 (A) ionic (B) non-polar covalent (C) polar covalent (D) dative
- (13) ..... deduced that "it is not possible to determine with accuracy both the position and the velocity of an electron at the same time"  
 (A) Heisenberg (B) de Broglie (C) Plank (D) Pauli
- (14) The magnetic quantum number ( $m_l$ ) describes the orbital's .....  
 (A) size (B) shape (C) energy (D) orientation in the space
- (15) The  $\text{NO}_2^-$  ion has ..... resonating structures.  
 (A) 0 (B) 1 (C) 2 (D) 3
- (16) The number of nonbonding electron pairs on Cl atom in  $\text{ClF}_3$  molecule = .....  
 (A) 1 (B) 2 (C) 3 (D) 4
- (17) The molecular geometry of  $\text{ClF}_3$  molecule is .....  
 (A) trigonal planar (B) trigonalpyramidal (C) tetrahedral (D) T-shaped
- (18) The bond order in the  $\text{C}_2$  molecule = .....  
 (A) 1 (B) 2 (C) 3 (D) 4
- (19) The total number of electron pairs on the S atom in the  $\text{SF}_4$  molecule = .....  
 (A) 3 (B) 4 (C) 5 (D) 6
- (20) The geometrical shape of  $\text{SF}_4$  molecule is .....  
 (A) square planar (B) trigonal bipyramidal (C) seesaw (D) tetrahedral
- (21) The highest energy electrons in the  $\text{N}_2$  molecule occupy the ..... orbital.  
 (A)  $\sigma$  (B)  $\sigma^*$  (C)  $\pi$  (D)  $\pi^*$
- (22) The electron domain geometry of  $\text{NO}_2^-$  ion is .....  
 (A) tetrahedral (B) trigonal planar  
 (C) trigonal bipyramidal (D) linear
- (23) Molecules with trigonal bipyramidal geometry have ..... Hybrid orbitals  
 (A)  $\text{sp}^2$  (B)  $\text{sp}^3$  (C)  $\text{sp}^3\text{d}$  (D)  $\text{sp}^3\text{d}^2$
- (24) The formal charge of S atom in  $\text{SO}_3$  molecule = .....  
 (A) -1 (B) +1 (C) -2 (D) +2
- (25) The bond order in the  $\text{O}_2^+$  ion is .....  
 (A) 1 (B) 1.5 (C) 2 (D) 2.5

**Q2: Answer (T) for true sentences or (F) for False sentences: (One mark for each)**

- (26) At atmospheric pressure  $> 1$  atm, water boils at temperatures  $< 100^\circ\text{C}$ .
- (27) The average kinetic energy of the gas molecules is inversely proportional to absolute temperature.
- (28) The viscosity of a liquid decreases with an increase in the temperature.
- (29) The Van der Waal's constants "a" and "b" are different for different gases.
- (30) True solids are anisotropic substances while amorphous solids are isotropic ones.

Please turn over for the rest of questions



Assiut University  
Faculty of Science  
Chemistry Department



14<sup>th</sup> May 2025  
Time allowed: 2 h

Second Semester Examination  
Subject: General Chemistry (C-100)  
Students: First Level "Credit Hours System"

**Q1: Choose the correct answer A, B, C, or D in the following sentences: (One mark for each)**

- (1) The density of a gas is 3.48 g/L at STP, what is its molecular mass? ( $R = 0.0821 \text{ L atm mol}^{-1} \text{ K}^{-1}$ )  
(A) 44.606 g/mole (B) 77.998 g/mole  
(C) 32.055 g/mole (D) 147.112 g/mole
- (2) A sol is prepared by adding  $\text{Fe}(\text{NO}_3)_3$  solution to an excess of  $\text{NH}_4\text{OH}$  solution. The charge likely to develop on colloidal particles is .....  
(A) positive (B) negative (C) both charges (D) no charge
- (3) For a gas, which pairs of variables are inversely proportional to each other if all other conditions remain constant)?  
(A) P, T (B) V, T (C) P, V (D) n, V
- (4) The order of diffusion of  $\text{NH}_3$ ,  $\text{SO}_2$ ,  $\text{Cl}_2$ , and  $\text{CO}_2$  gases is:  
(A)  $\text{NH}_3 > \text{SO}_2 > \text{Cl}_2 > \text{CO}_2$  (B)  $\text{NH}_3 > \text{CO}_2 > \text{SO}_2 > \text{Cl}_2$   
(C)  $\text{Cl}_2 > \text{SO}_2 > \text{CO}_2 > \text{NH}_3$  (D) None of these
- (5) Which of the following liquids has the highest viscosity?  
(A) Water (B) Ethyl alcohol (C) Acetone (D) Glycerin
- (6) Select the correct cell reaction of the cell:  $\text{Cu(s)} | \text{Cu}^{2+}(\text{aq}) || \text{Ag}^+(\text{aq}) | \text{Ag(s)}$   
(A)  $2\text{Ag(s)} + \text{Cu(s)} \rightarrow \text{Cu}^{2+}(\text{aq}) + 2\text{Ag}^+(\text{aq})$   
(B)  $\text{Cu(s)} + 2\text{Ag}^+(\text{aq}) \rightarrow \text{Cu}^{2+}(\text{aq}) + 2\text{Ag(s)}$   
(C)  $2\text{Ag(s)} + \text{Cu}^{2+}(\text{aq}) \rightarrow \text{Cu(s)} + 2\text{Ag}^+(\text{aq})$   
(D)  $\text{Cu}^{2+}(\text{aq}) + 2\text{Ag}^+(\text{aq}) \rightarrow 2\text{Ag(s)} + \text{Cu(s)}$
- (7) The potential of the cell made up of  $\text{Zn/Zn}^{2+}(0.25 \text{ M})$  and  $\text{Cu/Cu}^{2+}(0.25 \text{ M})$  at 25 °C is .....  
(A) 1.39 V (B) 2.09 V (C) 1.10 V (D) 1.49
- (8) Water vapor can be absorbed by .....  
(A) silica (B) alumina  
(C) charcoal (D) anhydrous calcium chloride
- (9) The dialysis process can be accelerated by:  
(A) applying a magnetic field (B) temperature lowering  
(C) irradiation with infrared light (D) applying an electric field
- (10) The compressibility factor for a real gas at high pressure is .....  
(A) 1.0 (B)  $1 + (\text{Pb}/\text{RT})$   
(C)  $1 - (\text{Pb}/\text{RT})$  (D)  $1 + (\text{RT}/\text{Pb})$

Please turn over for the rest of questions





إمتحان النظري للفصل الدراسي الثاني لطلاب كلية العلوم  
المادة: تاريخ العلوم - كـ ( ١٢ م.ج )



الرمز : ساعات  
الإس ٢٠٢٥/٥/٢١

المستوى الأول

قسم الكيمياء

|    |                                                                                                               |                                                                            |                                   |                              |                        |                |
|----|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------|------------------------------|------------------------|----------------|
| 37 | نجح الكيميائي الأمريكي .....                                                                                  | من اكتشاف معظم خطوات تثبيت الكربون في عملية البناء الضوئي                  | أ. شيلدن و شوان                   | ب. ملفن بلاستيد              | ج. كالفن               | د. كيلفن كلاين |
| 38 | ريما يعتبر .....                                                                                              | مؤسس الكيمياء التي تحولت فيما بعد إلى ما يعرف بالتحليل الكمي               | أ. أرسطو                          | ب. ابن سينا                  | ج. ابن حيان            | د. إقليدس      |
| 39 | كانت دراسة .....                                                                                              | تهدف إلى معرفة مواعيد الفيضانات و مواسم زراعة المحاصيل في الحضارة البابلية | أ. الفلك                          | ب. المناخ                    | ج. التنجيم             | د. التكهون     |
| 40 | زعم شخص أن المحرك الخاص به يظل يعمل دون الحاجة إلى أي طاقة خارجية يدرج تحت البند رقم .....                    | من بنود روبرت بارك لتميز العلم الزائف                                      | أ. 2                              | ب. 4                         | ج. 6                   | د. 8           |
| 41 | تؤدي عملية رصد العالم للظاهرة إلى تغيير صفات المرصود ؛ لهذا توصف فيزياء الكم بأنها ....                       | أ. احتمالية                                                                | ب. حتمية                          | ج. اختيارية                  | د. تقريبية             |                |
| 42 | استطاع أينشتاين تفسير ظاهرة التأثير الكهروضوئي باستخدام فكرة بلانك من حيث كون                                 | أ. الضوء يحرك الإلكترونات                                                  | ب. الضوء ينكسر بين الهواء و الماء | ج. الطاقة تنتقل في صورة كمات | د. الطاقة تفنى و تتجدد |                |
| 43 | وضع .....                                                                                                     | عددا من السمات التي تتصف بها الإنجازات العلمية الزائفة                     | أ. روبرت بارك                     | ب. روبرت مارك                | ج. كارل بوبر           | د. روبرت بارك  |
| 44 | يطلق على التحول الثوري خلال التطور العلمي الجديد غير المحكوم بالنظريات السائدة و القوانين القديمة مصطلح       | أ. تحسين النموذج                                                           | ب. هدم النموذج                    | ج. تبديل النموذج             | د. تحسين الأوضاع       |                |
| 45 | يعتبر العالم و الفيلسوف الإغريقي .....                                                                        | هو أبرز شخصية في تاريخ الحضارة الإغريقية                                   | أ. هامان                          | ب. أرشميدس                   | ج. أفلاطون             | د. أرسطو       |
| 46 | يعرف بأنه أول من قام بقياس ثابت الجاذبية، وتحديد كتلة الأرض كما أنه أول من أطلق لفظ (Hydrogen) على ذلك العنصر | أ. شيلدن و شوان                                                            | ب. هنري كافنديش                   | ج. لافوزيه                   | د. بيكر و أشتل         |                |
| 47 | كيميائي روسي ينسب إليه وضع الجدول الدوري للعناصر مرتبة اعتمادا على الخاصيتين (الوزن الذري و التكافؤ)          | أ. لافروف                                                                  | ب. مندليف                         | ج. جون نيولاند               | د. لافوزيه             |                |
| 48 | العالم الفرنسي .....                                                                                          | هو مكتشف الكلوروفيل                                                        | أ. ساكس                           | ب. بيليه كارتر               | ج. كارل بيليه          | د. باييتيه     |
| 49 | نجح في التوصل إلى نفس استنتاجات مندل و فروضة ، دون أن يعلم شيئا على الإطلاق عن بحث مندل                       | أ. كوينز                                                                   | ب. دي فريز                        | ج. سيسينج                    | د. فان هيلمونت         |                |
| 50 | توفي .....                                                                                                    | في معمله أثناء قيامه بإجراء بعض التجارب على سيانيد الهيدروجين              | أ. مندليف                         | ب. لافوزيه                   | ج. جلبرت لويس          | د. جون نيولاند |

مع تمنياتي للجميع بالتوفيق

د. دعاء عبد الرحمن

د. أماني عبد الرحمن

قسم الكيمياء



امتحان النظري للفصل الدراسي الثاني لطلاب كلية العلوم  
المادة: تاريخ العلوم - كود (١٢ م.ج)



الزمن : ساعتان  
الإنشئ : ٢٠٢٥/٥/٣١

المستوى الأول

قسم الكيمياء

### أجب عن الأسئلة التالية في ورقة البابل شيت (الاختبار في ثلاث صفحات - 50 درجة)

|    |                                                                                                                                               |                                 |                            |                             |                                |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------|-----------------------------|--------------------------------|
| 1  | ابتكار أحمد زويل طريقة..... بهدف قياس الزمن المنقضي للتفاعلات                                                                                 | أ. لكسر الرابطة الكيميائية      | ب. لربط الروابط            | ج. لانجذاب العناصر          | د. لهدم النواتج                |
| 2  | كان أرسطو يرى أن كل ما هو موجود في الكون، من حي أو جماد، يتكون من                                                                             | أ. الذرات                       | ب. الطاقة والروح           | ج. الشكل والمادة            | د. الشكل والروح                |
| 3  | اتسم علم..... بالسرية مما وجه أذهان العامة إلى كون المشتغلين بهذا العلم من السحرة والمشعوذين                                                  | أ. الكيمياء                     | ب. الفيزياء                | ج. الفلك                    | د. الرياضيات                   |
| 4  | الطاقة ليست متصلة و غير قابلة للتقسيم اللانهائي و تنتقل في صورة وحدات غير قابلة للتشطار عمليا                                                 | أ. مبدأ عدم اليقين              | ب. بنود نظرية الضوء        | ج. قانون بقاء الطاقة        | د. بنود نظرية ماكس بلانك       |
| 5  | من أبرز سمات..... أن المقدمات الواضحة والمعطيات المعروفة، تصل بنا إلى نتائج لا مجال للشك فيها                                                 | أ. الفيزياء الحديثة             | ب. فيزياء نيوتن            | ج. فيزياء أينشتاين          | د. فيزياء الكم                 |
| 6  | بحسب تجارب العرب الأوائل؛ فتفاعل الدخان مع القوام المائي يؤدي إلى تكوين مادتين وسيطتين، هما                                                   | أ. الهواء والماء                | ب. الكبريت والفسفور        | ج. الزئبق والكبريت          | د. الفسفور والزئبق             |
| 7  | رئز العلماء النهضة الأوروبية ومنهم..... على تفسير ظاهرة احتراق المواد (نظرية الفلوجستون)                                                      | أ. شوان و اشتال                 | ب. بيخر و اشتال            | ج. شيل و بريستي             | د. شيلدن و شوان                |
| 8  | عالم ألماني تمكن من وضع معادلة البناء الضوئي                                                                                                  | أ. ساكس                         | ب. يان الجنهوش             | ج. فان هيلمونت              | د. هيروودوت                    |
| 9  | نجح اللورد ريلي في اشتقاق صيغة رياضية تتوافق مع طاقة الإشعاع المنبعث عند                                                                      | أ. الأطوال الموجية القصيرة      | ب. الأطوال الموجية العالية | ج. الأطوال الموجية المنخفضة | د. الأطوال الموجية غاية القصير |
| 10 | الجسم الذي يسخن إلى درجة حرارة مرتفعة نسبيا يطلق إشعاعا                                                                                       | أ. منخفض الحرارة                | ب. طويل الموجة             | ج. منخفض التردد             | د. قصير الموجة                 |
| 11 | اتسم البحث العلمي خلال الحضارة..... بالواقعية والميل إلى الاستفادة العملية المباشرة من العلم                                                  | أ. الإغريقية                    | ب. الرومانية               | ج. الإسلامية                | د. المصرية القديمة             |
| 12 | إن قطع رأسه لم يستغرق أكثر من لحظة، و قد لا تكفي مائة عام لنهوب رأساً نظيره .. عبارة تاريخية قالها عالم الرياضيات لاجرانج حزنا على إعدام..... | أ. لافوريه                      | ب. نيوتن                   | ج. غاليليو                  | د. أينشتاين                    |
| 13 | يتميز العلم بقدرة العلماء على التنبؤ العلمي و الذي يعني                                                                                       | أ. توقع النتائج في ضوء المقدمات | ب. تجربة الفرضيات          | ج. تحليل البيانات           | د. تقليل الأخطاء               |
| 14 | يعتقد أن الأصلها المصري لكلمة كيمياء مشتق من كلمة كمت و المقصود بها                                                                           | أ. تربة النيل                   | ب. الذهب                   | ج. الماء                    | د. الهواء                      |
| 15 | من سمات فيزياء الكم أنك تستطيع أن تتأكد من شيء واحد فقط، ولكن لا يمكنك جمع معلومتين بدقة في آن واحد فيسمى بمبدأ                               | أ. conservation                 | ب. relativity              | ج. probability              | د. uncertainty                 |
| 16 | كان علماء الحضارة..... يعملون بدافع تحقيق غايات واضحة ومحددة سلفا                                                                             | أ. المصرية القديمة              | ب. اليونانية               | ج. الرومانية                | د. الهندية                     |
| 17 | بانتهاه الثلث الأول من القرن 20 كان عدد العناصر المعروفة لدى الكيميائيين حوالي..... عنصرا                                                     | أ. 46                           | ب. 45                      | ج. 50                       | د. 56                          |
| 18 | عالم الكيمياء العربي الذي راجع نظرية فلاسفة الإغريق و صححها                                                                                   |                                 |                            |                             |                                |



16- Which of the following is true about macrophages?

- a) Express CD4
- b) Only involved in adaptive immunity
- c) Play important role in killing virus infected cells by secreting granzymes.
- d) Settle mainly in the tissue.

17- Non-immunogenic antigen that can be covalently linked to a carrier protein to make it an immunogenic molecule is termed:

- a) Adjuvant
- b) Carrier
- c) Hapten
- d) Superantigen

18- Which cells utilize reactive oxygen species and lysosomal enzymes to kill pathogens?

- a) Cytotoxic T cells
- b) Macrophages
- c) Natural killer (NK) cells
- d) Th1 cells

19- C3b is able to bind on a microbe that will make it more attractive for phagocytosis.

This process is

- a) Agglutination
- b) Complement activation
- c) Neutralization
- d) Opsonization

20- Which is an effector cell involved in ADCC of viral infected cells?

- a) B cells
- b) Helper T cells
- c) Natural killer cells
- d) Regulatory T cells

II) Put (T) true or (F) false for the following statement (1 mark x 20):

|    |                                                                                                                                                                   |  |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 21 | Fusion between a plasma cell and a tumor cell creates a Myeloma                                                                                                   |  |
| 22 | The membrane attack complex in the complement pathway consists of C5a, 6, 7, 8, 9                                                                                 |  |
| 23 | T cells can only see and respond to antigens associated with MHC molecules on antigen presenting cells                                                            |  |
| 24 | Movement of cells toward objects in response to chemical agents called opsonization                                                                               |  |
| 25 | NK cells play a similar role of cytotoxic T cells but unlike Tc cells its action is not restricted by MHC                                                         |  |
| 26 | B cells mature in the Thymus while T cells mature in the bone marrow and gut associated lymphoid tissue (GALT).                                                   |  |
| 27 | "Magic bullet" therapy is done by using monoclonal antibodies to tumour specific antigens alone or after coupling to cytotoxic agents                             |  |
| 28 | Penicillin, anesthetics and insect venom are associated with Type I hypersensitivity                                                                              |  |
| 29 | In type III hypersensitivity, Neutrophils are attracted by C5a and bind immune complexes by their Fc receptors and release lysosomal enzyme causing tissue damage |  |
| 30 | Cilia of the epithelia lining respiratory tract passages remove trapped microbes is a type of the chemical barrier                                                |  |

|    |                                                                                                                                               |  |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------|--|
| 31 | NK express Fas-L to interact with Fas on target cell inducing apoptosis                                                                       |  |
| 32 | T cell receptor is composed of a dimer of alpha ( $\alpha$ ) and beta ( $\beta$ ) chains which is non-covalently associated with CD3 complex. |  |
| 33 | Adjuvants boost the immune response when an Ag has low immunogenicity                                                                         |  |
| 34 | Bacteria are cleared from the blood stream mainly by spleen.                                                                                  |  |
| 35 | TNF $\alpha$ is An example of a cytokine produced by activated macrophages with a major role in the innate immune response.                   |  |
| 36 | The sequelae associated with exposure to superantigen is due to release of large amount of Antibodies.                                        |  |
| 37 | Once B cells leave the bone marrow they are completely immature.                                                                              |  |
| 38 | Substances that enhance the immunogenicity of molecules without altering their composition are termed Carriers.                               |  |
| 39 | Activated Th17 secrete IL-7 that recruits neutrophils and induce inflammation                                                                 |  |
| 40 | Cell mediated immunity is mediated by cells e.g. T lymphocytes and NK cells                                                                   |  |
| 41 | Secondary (peripheral) lymphoid organs include bone marrow and thymus.                                                                        |  |
| 42 | Paratope is the part of the antibody that binds the epitope                                                                                   |  |
| 43 | Treg function is suppression of immune response of autologous lymphocytes and regulate immune response.                                       |  |
| 44 | CD4 T helper cells represents 35% of T cells in blood.                                                                                        |  |
| 45 | Monoclonal antibodies can be used for identification of antigens on cells and microbes                                                        |  |
| 46 | Classical pathway of the complement activates proteases associated with MBL that cleave C2 and C4 components of complement                    |  |
| 47 | Delayed hypersensitivity cannot be passively transferred from one to another by serum, but can be transferred by T-lymphocytes                |  |
| 48 | Th 17 cells secrete $\rightarrow$ IL-10 and transforming growth factor (TGF)- $\beta$                                                         |  |
| 49 | Phagocytic cells include macrophages, monocytes, NK, dendritic cells and neutrophils                                                          |  |
| 50 | Myeloid cells include monocytes, macrophages, neutrophils, basophils, eosinophils                                                             |  |

GOOD LUCK



**8-Which of the following is a Recombinant vaccine?**

- a) Hepatitis B vaccine
- b) Hib vaccine
- c) Var vaccine
- d) DPT vaccine

**9- All the given vaccines are attenuated or inactivated whole pathogen except.....**

- a) Salk
- b) Sabin
- c) Hepatitis A
- d) Tetanus

**10- The CD4 + T cell subset responsible for Immune response against tumors and intracellular infections is:**

- a) TH1 cells
- b) TH2 cells
- c) TH17 cells
- d) T cytotoxic cells

**11- CD40 Ligand (CD154) is expressed by which of the following?**

- a) B cells
- b) Dendritic cells
- c) Resting T cells
- d) Activated T cells

**12-A Delayed hypersensitivity reaction is characterized by:**

- a) An infiltrate composed of helper T cells and macrophages
- b) An infiltrate composed of neutrophils
- c) Edema without a cellular infiltrate
- d) An infiltrate composed of eosinophils

**13-Naturally acquired active immunity would be most likely acquired through which of the following processes?**

- a) Vaccination
- b) Drinking colostrum
- c) Natural birth
- d) Infection with disease causing organism followed by recovery

**14-Passively acquired immunity:**

- a) Involves active generation of antibodies by the individual
- b) Does not depend on the type or amount of immunoglobulin
- c) Of long duration
- d) May be brought about by the administration of preformed antibodies

**15-Tissue injury in cytotoxic hypersensitivity reaction is initiated by**

- a) Ab interfering with the functioning of biologically active substance
- b) Antigen reacting with cell bound Antibody
- c) Ab reacting with cell bound Ag
- d) Formation of Ag-Ab complex



### Immunology Exam for Third Year Science Students

#### I) Choose correct answer (1mark x 30)

1- Natural killer cells assess whether other cells are abnormal by detecting types and levels of surface associated:

- a) MHC-I
- b) Non self -molecules
- c) Pathogen-associated molecular patterns
- d) Pattern recognition receptors

2- An example of a cytokine produced by activated macrophages with a major role in the innate immune response is:

- a) IL-17
- b) IL-2
- c) IL-4
- d) TNF $\alpha$

3- During type I hypersensitivity reaction, the mast cell are

- a) destroyed
- b) activated
- c) degranulated
- d) lysed

4- The principle difference between cytotoxic (type II) and immune complex (type III) hypersensitivity is:

- a) The participation of T cells
- b) The participation of complement
- c) The class of antibody
- d) Whether the antibody reacts with the antigen on the cell or react with the antigen before it interacts with the cell.

5- A complement component which is strongly chemotactic for neutrophils is:

- a) C3
- b) C3b
- c) C5a
- d) C5b

6- The complement pathway initiated by spontaneous hydrolysis of C3 to generate C3b is termed:

- a) Classical pathway
- b) Alternative pathway
- c) Lectin pathway
- d) Immune complex pathway

7- Sequelae associated with exposure to super-antigen is due to release of large amount of:

- a) Cytokines by T cell
- b) Cytokines by B cell
- c) Cytokines by macrophage cell
- d) Antibodies