



**Faculty of Computers & Artificial Intelligence, Benha University**

**Student Name:** .....

**Seat Number:** .....

**Academic Year:** ..... / .....

First Semester     Second Semester     Summer

**Program Name:** .....

**Course Name:** .....

**Exam Date:** ...../...../ .....

Question No	Marks attained	Full Mark	Examiner
Q1			
Q2			
Q3			
Q4			
Q5			
Q6			
Q7			
Q8			
Q9			
Q10			
<b>Total For written exam</b>			
<b>Class Work</b>			
<b>TOTAL MARKS</b>			

**Total Marks**


<b>Total Marks (in Letters)</b>	.....		
<b>Examination Committee</b>	<b>Examiner No. 1</b>	<b>Examiner No. 2</b>	<b>Examiner No. 3</b>

# Model answer

## Answer the following questions

### Question No. 1

[30 Marks]

#### 1- Choose the correct answer

##### 1- Energy levels

- a- The protons are found at considerable distances from the nucleus in a series of levels
- b- The electrons are found at considerable distances from the nucleus in a series of levels**
- c- The neutrons are found at considerable distances from the nucleus in a series of levels
- d- All of the above

##### 2- Isotopes are atoms which have

- a- The same atomic weight but different atomic numbers
- b- The same atomic number but different mass numbers**
- c- The same atomic number and mass numbers
- d- All of the above

##### 3- The energy level closest to the nucleus is

- a-  $3s$ - orbital
- b-  $2s$ - orbital
- c-  $4s$ - orbital
- d-  $1s$ - orbital**

##### 4- The noble gases are called

- A- Group zero or group eight
- b- Group eight not group zero
- c- Group zero not group eight**
- d- All of the above

##### 5- sulphur dioxide has

- a- No resonance structure
- b- Three resonance structure
- c- Four resonance structure
- d- Two resonance structure**

##### 6- The filling of orbitals singly where possible or Electrons fill the orbital firstly single

- a- Electronic theory
- b- Hund`s rule**
- c- Aufbau principle
- d- All of the above

##### 7- Protons are

- a- Do not have a charge and so would continue on in a straight line
- b- Negatively charged and so would be deflected on a curving path towards the positive plate
- c- Positively charged and so would be deflected on a curving path towards the negative plate**
- d- All of the above

##### 8- Atoms are

- A- Electrically negative charge.
- b- Electrically positive charge.
- c- Electrically neutral charge.**
- d- All of the above

##### 9- The electron can found anywhere within a spherical space surrounding the nucleus called

- a-f-orbital.
- b-p-orbital.
- c-d-orbital.
- d-S-orbital.**

- 10- At the fourth level there are total  
 a- nine orbitals altogether      **b- Sixteen orbitals in all.**  
 c- two orbitals altogether      d- Four orbitals altogether
- 11- Each energy level can only hold a certain number of  
 a- Neutrons      b- Protons      **c- Electrons**      d- All of the above
- 12- Formal charge equal to  
 a- Group number plus number of bond minus number of unshared electron  
 b- Group number minus number of bond plus number of unshared electron  
**c- Group number minus number of bond minus number of unshared electron**  
 d- Number of bond minus group number minus number of unshared electron
- 13- At the third level there are a total  
**a- Nine orbitals altogether**      b- Six orbitals altogether  
 c- Two orbitals altogether      d- Sixteen orbitals altogether
- 14- **Atomic number** it is the number of  
 a- Neutrons or number of protons      **b- Electrons or number of protons**  
 c- protons or number of neutrons      d- All of the above
- 15- According to Lewis structure nitric acid has  
 a- No resonance structure      b- Three resonance structure  
 c- Four resonance structure      **d- Two resonance structure**
- 16- The **nucleus** is at the centre of the atom and contains the  
 a- Electrons and neutrons      b- Protons and electrons  
**c- Protons and neutrons**      d- All of the above
- 17- **Mass number** is the number of  
 a- The number of protons plus number of electrons present in the atom  
 b- The number of electrons plus number of neutrons present in the atom  
**c- The number of protons plus number of neutrons present in the atom**  
 d- All of the above
- 18- Electrons fill low energy orbitals before they fill higher energy ones  
 a- Hund's rule      **b- Aufbau principle**      c- Electronic theory      d- All of the above
- 19- If an electron is in a particular orbital it will have  
 a- A particular definable charge.      **b- A particular definable energy.**  
 c- A particular definable energy and charge.      d- All of the above.
- 20- The number of electrons in the outer level is the same as  
 a- Atomic number      b- The period number  
**c- The group number**      d- All of the above

- 21- The force of the gas that the gas exerts on the walls of the container divided by the surface area of the container is called the ..... of gas  
 a- pressure      b- volume      c- surface area      d- none of them
- 22- A gas occupies 180 mL under a pressure of 1.5 atm if the temp. is held const, at 1 atm the gas will occupy.....mL  
 a-270      b- 540      c- 200      d- none of them
- 23- At 45 °C, N<sub>2</sub> gas occupies 159 mL. if the temperature of it is decreased to zero °C, it will occupy ..... mL at constant pressure.  
 a-68.25      b- 136.5      c- 220      d- none of them
- 24- The pressure of 0.5 mole Cl<sub>2</sub> gas that occupies 10 L container at 100 °C, equals....  
 a- 0.766 atm      b- 50 atm      c- 1.532 atm      d- none of them
- 25- The weight of one liter NH<sub>3</sub> gas at 100 °C and 2.5 atm equals .....  
 a- 0.766 gm      b- 150 gm      c- 1.276 gm      d- none of them
- 26- the density of bromine gas (Cl<sub>2</sub>) at STP equals..... (Atomic weight of Cl =35.5)  
 a- 0.003 gm/ml      b- 1.5 gm/ml      c- 1.207 gm/ml      d- none of them
- 27- what volume of O<sub>2</sub> is required for the combustion of 30 L C<sub>2</sub>H<sub>6</sub> if all gases are measured at same temperature and pressure according to the following reaction:  

$$2\text{C}_2\text{H}_6 + 7\text{O}_2 \longrightarrow 4\text{CO}_2 + 6\text{H}_2\text{O}$$
 a- 105 L      b- 225 L      c- 50 L      d- none of them
- 28- a mixture of 32 gm of O<sub>2</sub>+28 gm of N<sub>2</sub> has a total pressure 1.2 atm. The partial pressure of O<sub>2</sub> equals ..... (Atomic weight of O =16 g & N=14 g)  
 a- 1 atm      b- 0.6 atm      c- 2.4 atm      d- none of them
- 29- 10 L container is filled with a gas under a pressure of 1 atm at 0°C, at what temperature will the pressure inside the container to be 5 atm  
 a- 1365 K      b- 50 K      c- 200K      d- none of them
- 30- How many grams of Fe are needed to produce 200 L of H<sub>2</sub> at STP according to the following equation:  $3\text{Fe} + 4\text{H}_2\text{O} \longrightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$  (Atomic weight of Fe =56 g)  
 a- 750.5 g      b- 375.2 g      c- 240.3 g      d- none of them

## Question No. 2

[20 Marks]

- 1- At the third level there are total nine orbitals altogether ( ✓ )
- 2- 5s-orbitals fill firstly after the 4d- orbitals ( X )
- 3- Elements in group one and two are described as s-block elements ( ✓ )
- 4- Within a group of the periodic table, an increase in atomic radius is generally observed from top to bottom with the group. ( ✓ )
- 5- The third ionization energy of an element refers to the removal of one electron from a 3+ ion of the element ( X )
- 6- A covalent bond consists of a pair of electrons that is shared by two atoms. ( X )
- 7- The d orbital is rather like two identical balloons tied together to the nucleus. ( X )
- 8- The s- orbital always has a slightly lower energy than the p- orbitals at the same energy level ( ✓ )

- 9- An element may occur in nature as a mixture of various types of atoms that have identical chemical properties and mass (X)
- 10- Nowadays, the atomic or molecular mass is measured instrumentally using ultra violet spectrometry. (X)
- 11- A chemical compound is the result of the combination of atoms of two or more elements in a simple numerical ratio. (✓)
- 12- All atoms of the same elements are different (X)
- 13- The dipole moments of nonpolar molecules are zero (✓)
- 14- Actually the quantity of the product obtained from the reaction is more than the amount calculated (X)
- 15- The simplest or empirical formula indicates the relative numbers of atoms of various types that make up the compound (✓)
- 16- The atomic radii of the representative elements decrease across a period from left to right (✓)
- 17- Energy is usually evolved by electron affinity (✓)
- 18- The electron cloud of the bond is distributed asymmetrically around the two nuclei. (X)
- 19- The dipole moments of polar diatomic molecules decreases as the polarity of the molecule increases. (X)
- 20- The separation and union of atoms occur in a chemical reactions (✓)
- 21- Any two or more gases can be mixed in any proportions to prepare uniform mixture. (✓)
- 22- gas can be easily compressed as it consists of widely separated molecules (✓)
- 23- Boyle stated that the pressure of the gas is directly proportional to its volume at constant temperature (X)
- 24- The volume of gas is inversely proportional to its temperature at constant pressure (X)
- 25- the pressure of the gas is directly proportional to its temperature at constant volume (✓)
- 26- 1 mole of a gas occupies half volume that 2 moles of this gas at fixed pressure and temperature (✓)
- 27- the number of moles of the gas varies directly with its volume at constant temperature and pressure (✓)
- 28- the actual volume of the individual molecules of the gas is negligible compared to the whole volume of the gas (✓)
- 29- The kinetic energy of the gas molecule decreases as the temperature increases (X)
- 30- The attractive forces between gas molecules are negligible (✓)
- 31- at zero degree celsius, the kinetic energy of the gas molecules is theoretically zero (✓)
- 32- equal volumes of all gases at the same temperature and pressure contain the same number of molecules (✓)
- 33- a mole of  $N_2$  occupies the same volume as a mole of  $O_2$  will occupy at the same Temp and pressure (✓)
- 34- the molecular weight of the gas equals the weight of 242 L of it at STP (X)
- 35- the total pressure of a mix of two gases equals the sum of the partial pressures of the two gases if they can react with each other (X)
- 36- mixing of two gases or more than two doesn't change the average kinetic energy of any mixed gas at the same temperature (✓)
- 37- the number of moles of any gas is the ratio between its weight and its volume (X)

38- the unit of pressure is called Pascal which equals  $\text{Kg/m.S}^2$  ( ✓ )

39- the gas molecules expand to fill its container ( ✓ )

40- the molecules of any gas can easily fit between the molecules of another gas ( ✓ )

**GOOD LUCK,**

**Prof . Dr. Alaa S. Amin**

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