جامعة اسيوط (يونيو 2016) المادة : التفكير العلمى
كلية العلوم رقم المادة : 14 م ج الزمن : ساعتان

سؤال اجبارى : (20 درجة)

الانسان يصطنع منهجا يتيح له الاتصال المباشر بالواقع ، عن طريق الجمع بين العقل والتجربة ، إلا فى مرحلة متأخرة من تاريخه . فلا بد إذن أن عقبات أساسية حالت دون تحقيق هذا الاتصال المباشر بين الإنسان والعالم عن طريق العلم . فما هى هذه العقبات التى أخرت ظهور العلم ، والتى لاتزال تشوه صورة المعرفة العلمية حتى يومنا هذا عند فئات كثيرة من البشر ؟

اجب عن سؤالين فقط

السؤال الاول : (15 درجة)

التفكير العلمى هو ذلك النوع من التفكير المنظم .. الذى يمكن ان نستخدمة فى شئون حياتنا اليومية .. أو فى النشاط الذى نبذله حين نمارس أعمالنا المهنية المعتادة .. أو فى علاقاتنا مع الناس ... تكلم بالتفصيل عن سمات التفكير العلمى .

السؤال الثانى : (15 درجة)

ليس العلم ظاهرة منعزلة ، تنمو بقدرتها الذاتية وتسير بقوة دفعها الخاصة وتخضع لمنطقها الداخلى البحت ، بل أن تفاعل العلم مع المجتمع حقيقة لا ينكرها أحد . تكلم بالتفصيل عن الابعاد الاجتماعية للعلم المعاصر.

السؤال الثالث : (15 درجة)

وضح الاتى : 1- العناصر الاخلاقية فى شخصية العالم .

2- العلاقه بين العلم و التكنولوجيا.

تمنياتى لكم بالتوفيق

أ.د. محمد زيدان

كلية العلوم الفصل الدراسي الثاني ٢٠١٥/١٢ ٢٠١٦ م	امتحان لطلاب كليه العلوم المستوي الاولي تاريخ العلوم	الزمن: ساعتان المادة: تاريخ العلوم(١٢م.ج) اليوم: الاحد التاريخ: ٢٠١٦/٦/١٩م

أجب عن جميع الاسئلة الاتيه

السؤال الاول: ضع علامة صح او خطا امام العبارات الاتية: **(٣٠ درجة)**

(١)يعتبر ابن ملكا من الرواد الاوائل في علم الارض ( )

(٢) يعتبر اقليدس من مؤسسي علم الجبر في عصرة عند اليونانين ( )

(٣)من اشهر علماء العرب في الاحياء ابن الهيثم ( )

(٤) من اهم انجازات الخازن هو كتاب القانون المسعودي ( )

(٤)الجاحظ اول من لقب بشيخ النباتين العرب وله كتاب الجامع لصفات اشتات النبات ( ).

(٦) يعتبر ارسطو اول من وضع طريقة للتقطير في العالم ( ).

(٧) تعتبر النسبية العامة الزمن لا يمثل احد الابعاد الاساسية في الكون ( ).

(٨) هيتون هو اول من قال ان الارض تشبه صدفة محاطه بالمياه وان السماء تغطي هذه الصدفة( )

(٩) يعتبر الدينوري اول من الف موسوعة القانون ( ).

(١٠) اول من ابتكر مخدر قبل الجراحه وسماه المرقد هو ابو سينا ( ).

السوال الثاني: **(١٠ درجة)**

(أ) اذكر اسهامات العرب في تطورعلم الارض.

(ب) أذكر أهم عشر علماء ساهموا في تطور العلوم عبر التاريخ من وجهة نظرك.

السوال الثالث: **(١٠ درجة)**

(أ) اكتب شرح مبسط للنظرية النسبية لاينشتاين.

(ب) تكلم عن تطور علم الارقام عبر التاريخ.

مع تمنياتي لكم بالتوفيق

أستاذ دكتور \ أحمد ماهر عبدالباسط

Ministry of Higher Education
Assiut University
Faculty of Science

Final Exam
Term II, Year: 2015/2016
Second Year
Course Title: English Language (2)
Date of Exam: Wednesday 15/6/2016
Time Allotted: 120 Minutes

Answer the following questions:

Part I: Read the following passage *Carefully*, then answer the Questions below. **(20 points)**

Thomas Edison was born February 11, 1847 in Milan, Ohio. He was nicknamed "Al" at an early age. At age 11, Edison moved to Michigan where he spent the remainder of his childhood.

Thomas Edison struggled at school, but learned to love reading and conducting experiments from his mother who taught him at home. At age 15, Edison became a "tramp telegrapher", sending and receiving messages via morse code, an electronically-conveyed alphabet using different clicks for each letter. Eventually, he worked for the Union Army as a telegrapher. Edison often entertained himself by taking things apart to see how they worked. Soon, he decided to become an inventor.

In 1870, Edison moved to New York City and improved the stock ticker. He soon formed his own company that manufactured the new stock tickers. He also began working on the telegraph, and invented a version that could send four messages at once. Meanwhile, Edison married Mary Stillwell, had three children and moved his family to Menlo Park, New Jersey where he started his famous laboratory.

In 1877, Edison, with help from "muckers", individuals from around the world looking to make fortunes in America, invented the phonograph. The phonograph was a machine that recorded and played back sounds. He perfected the phonograph by recording "Mary had a Little Lamb" on a piece of tin foil! In 1878, Edison invented the light bulb as well as the power grid system, which could generate electricity and deliver it to homes through a network of wires. He subsequently started the Edison Electric Light Company in October of 1878.

In 1884, after he attained great fame and fortune, Mary Stillwell died: Edison remarried 20 year-old Mina Miller in 1886. He had three more children and moved to West Orange, New Jersey. At West Orange, Edison built one of the largest laboratories in the world. He worked extremely hard and registered 1,093 patents.

Edison continued to invent or improve products and make significant contributions to x-ray technology, storage batteries and motion pictures (movies). He also invented the world's first talking doll. His inventions changed the world forever. They still influence the way we live today. Edison worked until his death on October 18, 1931.

Questions:

1. **In what state did Thomas Edison NOT live?**
   a. Michigan
   b. Ohio
   c. Massachusetts
2. **How many children did Thomas Edison have?**
   a. 3
   b. 5
   c. 6
3. **What best describes Morse Code?**
   a. A language for deaf people
   b. A system of clicks that stand for letters
   c. A system of clicks that stand for words
4. **What was one of Thomas Edison's first accomplishments?**
   a. Inventing an improved stock ticker
   b. Inventing an improved x-ray
   c. Inventing tin foil
5. **A phonograph is most similar to:**
   a. A walkie-talkie
   b. A record player
   c. A television
6. **What is a "mucker"?**
   a. Someone from another country
   b. Someone from another country hoping to find a home in America
   c. Someone from another country hoping to make a fortune in America
7. **Select all of the following that Thomas Edison did not invent.**
   a. The first storage battery
   b. A power system that could deliver electricity to homes
   c. The first stock ticker
8. **What does the quote "Genius is 1 percent inspiration and 99 percent perspiration" mean?**
   a. Only geniuses should think of new ideas
   b. Geniuses have to sweat a lot to come up with good ideas.
   c. Great ideas take more hard work than ingenuity

Assiut University
Faculty of Science
Second Semester Final Examination
(June 2016)

Subject: English Language I **Code:** 015UR
Students: Level One **Time Allowed:** 2 hours

I- Identify the topic sentence in the following paragraph: (4 marks)

Some people leave too many lights on around the house. Some aren't careful about how much water they use. Americans waste a lot of resources. Most people buy products with a lot of unnecessary packaging that isn't good for the environment.

II- Find out the irrelevant sentence in the following paragraph: (4 marks)

Mr. Phillips is the principal of Lake Ridge School. He makes announcements every morning at 8:15 to greet all students and to get the day started. Every morning he makes a quick visit to all the classes and usually waves to the students. Mr. Phillips also walks around in the cafeteria to make sure students are safe. He likes to eat tacos. He also directs traffic on the cross walk at the end of each day.

III- Read the following passage then answer the questions below: (18 Marks)

When you imagine the desert, you probably think of a very hot place covered with sand. Although this is a good description for many deserts, Earth's largest desert is actually a very cold place covered with ice: Antarctica.

In order for an area to be considered a desert, it must receive very little rainfall. More specifically, it must receive an average of less than ten inches of precipitation—which can be rain, sleet, hail, or snow—on the ground every year. Antarctica, the coldest place on earth, has an average temperature that usually falls below the freezing point. And because cold air holds less moisture than warm air, the air in Antarctica does not hold much moisture at all. This is evident in the low precipitation statistics recorded for Antarctica. For example, the central part of Antarctica receives an average of less than 2 inches of snow every year. The coastline of Antarctica receives a little bit more—between seven and eight inches a year. Because Antarctica gets so little precipitation every year, it is considered a desert.

When precipitation falls in hot deserts, it quickly evaporates back into the atmosphere. The air over Antarctica is too cold to hold water vapor, so there is very little evaporation. Due to this low rate of evaporation, most of the snow that falls to the ground remains there permanently, eventually building up into thick ice sheets. Any snow that does not freeze into ice sheets becomes caught up in the strong winds that constantly blow over Antarctica. These snow-filled winds can make it look as if it is snowing. Even though snowfall is very rare there, blizzards are actually very common on Antarctica.

1) The main purpose of paragraph 1 is to

A. accept a conclusion B. introduce an argument
C. provide a brief history D. deny a common belief

(Go to the back of this sheet)

2) The best title for this passage would be

A. Earth's Many Deserts
B. Antarctica: The Coldest Place on Earth
C. A Desert of Ice
D. Unusual Blizzards

3) Africa's Sahara Desert is the second-largest desert on earth. Based on the information in the passage, what characteristic must the Sahara share with Antarctica?

A. low temperatures
B. high temperatures
C. frequent blizzards
D. low precipitation

4) As used in paragraph 2, which is the best definition for <u>precipitation</u>?

A. moisture in the air that falls to the ground
B. any type of weather event
C. weather events that only happen in very cold areas
D. a blizzard that occurs in areas with limited snowfall

5) In paragraph 2 the author writes, "And because cold air holds less moisture than warm air, the air in Antarctica does not hold much moisture at all." Using this information, it can be understood that

A. air in Africa holds more moisture than the air in Antarctica
B. air surrounding a tropical island holds less moisture than the air in Antarctica
C. air in the second floor of a house is typically warmer than air on the first floor
D. air at the mountains is typically colder than the air at the beach

6) Based on the information in the final paragraph, it can be understood that blizzards in Antarctica are mainly the result of

A. freezing cold temperatures
B. large amounts of snowfall
C. low amounts of precipitation
D. strong winds

IV- <u>Correct the following sentences</u>: **(24 Marks)**

1) Each of the girls sing well.
2) Fifty percent of the pie have disappeared.
3) Ten dollars are a high price to pay.
4) Neither she nor they was willing to predict the election.
5) Please give it to John or myself.
6) Whoever you elect will serve a four-year term.
7) Some of the pies is missing.
8) You should check your spelling, grammar, and punctuating.
9) The order was requested six weeks ago, therefore I expected the shipment to arrive by now.
10) I must study english and math.
11) The folder, not the letters, were misplaced.
12) He is not unwilling to help.

(Best Wishes)

Examiners:

Dr. Sherin Abdel Ghaffar
Dr. Yasser Ahmed Gomaa

Assiut University
Faculty of Science
Chemistry Department

August, 2016
Time: 2 hr.

Final Examination For 1st year Students (General Chemistry II, C-105).

Answer the following questions **Section (A)**

1. **Answer only two from the following:** (9 Marks)

a) For the following gaseous reaction:

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) \quad \Delta H = -92\ KJ$$

What is the effect of the following conditions on the equilibrium state: i) addition of more hydrogen, ii) increasing the temperature and iii) increasing the volume of the mixture to one-half of its original value.

b) Derive the relationship between K_c and K_p.

c) What is the pH value of a solution prepared by dissolving 0.0155 mole $Ba(OH)_2$ in water to give 735 ml aqueous solution? Assume that $Ba(OH)_2$ is completely dissociated.

2. **Answer only two from the following:** (8 Marks)

a) 0.035 mole of SO_2, 0.5 mole of SO_2Cl_2, and 0.08 mole of Cl_2 are combined in an evacuated 5.0 L flask and heated to 100°C. Which direction will the reaction proceed in order to establish the equilibrium?

$$SO_2Cl_2(g) \rightleftharpoons SO_2(g) + Cl_2(g) \quad (K_c = 0.078 \text{ at } 100°C)$$

b) What is the pH of 5% (w/w) H_3PO_4 solution? (d = 1.03 g/ml, $K_{a1} = 7.1 \times 10^{-3}$), [H = 1, P = 31, O = 16]

c) At 18°C, the solubility of CaC_2O_4 in water is 0.00067g/100 ml. Calculate its solubility product [Ca = 40, C = 12, O = 16].

3. **Answer only two from the following:** (8 Marks)

a) What will be the mole fraction of NO(g) at equilibrium if equimolar mixture of $N_2(g)$ and $O_2(g)$ is brought at equilibrium at 2500K?

$$N_2(g) + O_2(g) \rightleftharpoons 2NO(g) \quad (K_c = 2.1 \times 10^{-3})$$

b) What is the molarity of NH_4NO_3 solution that has a pH = 5.2? (K_b for $NH_4OH = 1.8 \times 10^{-5}$, $K_w = 1 \times 10^{-14}$)

c) A buffer solution is prepared that is 0.24M NH_3 and 0.2M NH_4Cl, what is the pH of this buffer?

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Section (B): Organic Chemistry

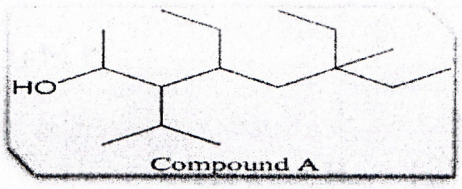
Answer the following questions:

Question 1: Give the meaning Only Five of the following giving an example: (5 Marks)

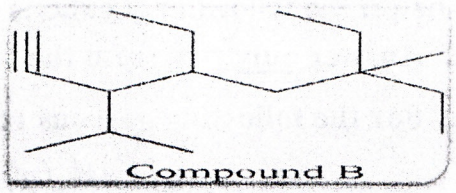
1- Electrophile 2- Constitutional isomerism 3- Heterolytic bond cleavage

4- Polar aprotic solvent 5- Regioselective reaction 6-

Question 2: For the following compounds, Answer Only Ten of the following (10 Marks)



Compound A


Compound B

1. Redraw the chemical structure of compounds A and B to illustrate the different atoms forming it
2. What is the IUPAC name of compounds A and B?
3. What is the number of primary, secondary, tertiary and quaternary carbon atoms in compound A?
4. What is the type of hybridization of carbon atoms in compound A and B?
5. What is the type of alcoholic group in compound A?
6. Give the reagent and expected dehydration products of compound A, encircle and give the IUPAC name of the major one (compound C)?
7. Draw and the different geometrical isomers of compound C and assign them by *E/Z* system.
8. Give the product(s) of reacting compound C with $KMnO_4$/NaOH on both hot and cold conditions.
9. What is the type of the triple bond in compound B?
10. What is the product of reacting compound B with $NaNH_2$ and then methyl bromide?
11. What is the product of the hydration of compound B?
12. Give the Ozonolysis products of compounds B and C

Question 3: Addition of HBr to 2-Methyl propene can be carried out according to Makovnikov's rule. But, in the presence of peroxide, the obtained product is anti-markovnikov.

Explain this fact by reaction mechanism. (10 Marks)

GOOD LUCK,,,,,,,,,,

Examiners: Dr. Mohamed Abdel Megeed Dr. Awad Ibrahem

Assiut University | **Special program**
Industrial chemistry
Final exam 2016

Energy resources
Time: 2 Hours | **Faculty of Science**

Answer the following questions:

Question NO. 1 (50 %).

a- Classify the energy resources according to their nature?
b- What are the advantages of:
   i- fossil fuels ii- biomass fuels
c- Define the followings:
   i- Specific heat .
   ii- Calorific value of fuel.
   iii- volatile matter.
   iv- Fixed carbon.
   v- Ash and ashes.
   vi- Ultimate and approximate analysis of coal.
d- How is biogas (biomethane) made? Sketch biogas digester unit.

Question NO. 2 (25 %).

a- Explain with sketches a simple idea for tracking of the solar collectors.
b- Compare between E-W and N-S main axis in case of linear parabolic collector.
c- Explain with sketches the theory of solar chimney.
d- What is frensel lens? What is its advantages ?

Question NO. 3 (25 %).

a- What is the difference between fission and fusion nuclear energy?
b- Give a flow sheet showing uranium fuel cycle?
c- What does uranium enrichment process means? Explain with sketches two different ways for enrichment process.
d- What are the main elements of the nuclear reactor? Give more than one example for each element.

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Best Wishes
Dr. Gomma A. Elsayed
Dr. M.S.Aboraia

Assiut University
Faculty of Science
Chemistry Department

Jun, 2016
Time: 2 hr.

Final Examination For 1st year Students (General Chemistry II, 105C, Industrial Chemistry Group).

Section A (Organic Chemistry)

1- Choose the correct answer (answer 5 only) **(5 Marks)**

a) Molecule of 1-propanol and 2- propanol have different:
i) Molecular masses, ii) Molecular formula, iii) Structure formula.

b) Which formula represents a saturated hydrocarbon?
i) C_2H_2, ii) C_2H_4, iii) C_3H_6, iv) C_3H_8

c) Which compound is an isomer of acetic acid?
i) Ethanol, ii) Methyl formate, iii) Methyl acetate, iv) Propionic acid

d) In a molecule of C_3H_8, the total number of covalent bonds is:
i) 11, ii) 10, iii) 8

e) Which compound is an ester? i) CH_3CHO, ii) $CH_3CO_2CH_3$, iii) CH_3COCH_3

f) A molecule of ethene is similar to a molecule of ethane in that they both have the same: i) Structural formula, ii) Molecular formula, iii) Number of carbon atoms.

2- Pent-1-ene reacts with hydrogen bromide to produce 2- bromopentane as a major product.

i) Outline the mechanism of the reaction **(2 Marks)**
ii) Identify the minor product of this reaction **(1 Mark)**
iii) Explain why 2- bromopentane is the major product **(2 Marks)**

3- Write equations displayed formula to show the conversion of But-1-ene into:

i) Polybut-1-ene, ii) But-2-ol, iii) But-1-ol, iv) 2-Bromobutane, v) 1,2-Dibrombutane. (Answer 4 only) **(8 Marks)**

4- a) Ozonolysis of an alkene produces equal amount of acetaldehyde and formaldehyde respectively. Deduce the alkene structure. **(2Marks)**

b) In which compound is carbon more oxidized: sodium carbonate or sodium acetate. **(2 Marks)**

c) Explain by using a mechanism, the synthesis of methylchloride from methane. **(3 Marks)**

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Section (B)

1. Answer only two from the following: (9 Marks)

a) For the following gaseous reaction:

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) \quad \Delta H = -92 \text{ KJ}$$

What is the effect of i) Addition of more nitrogen, ii) Lowering the temperature and iii) Reducing the volume of the mixture to one-half of its original value.

b) The K_c of the reaction: $(1/2)N_2 + (3/2)H_2 \rightleftharpoons NH_3$ is 5.2×10^{-5} at 298°C. What is the value of K_c of the reaction: $2NH_3 \rightleftharpoons N_2 + 3H_2$?

c) What is the pH value of a solution prepared by dissolving 0.0155 mole $Ba(OH)_2$ in water to give 735 ml aqueous solution? Assume that $Ba(OH)_2$ is completely dissociated.

2. Answer only two from the following: (8 Marks)

a) What is the pH of 5% (w/w) H_3PO_4 solution? (d = 1.03 g/ml, $K_{a1} = 7.1 \times 10^{-3}$)

b) At 18°C, the solubility of CaC_2O_4 in water is 0.00067g/100 ml. Calculate its solubility product (Ca = 40, C = 12, O = 16).

c) Calculate the mole fraction for a solution containing 11.7 g benzene (M. Wt.= 78 g/mol) and 4.6 g methylbenzene (M. Wt.= 92 g/mol) at 50°C.

3. Answer only two from the following: (8 Marks)

a) What is the solubility of $Mg(OH)_2$ in a buffer solution having pH = 9?

$$Mg(OH)_2 \rightleftharpoons Mg^{2+} + 2OH^- \quad (K_{sp} = 1.8 \times 10^{-11})$$

b) What is the molarity of NH_4NO_3 solution that has a pH = 5.2? (K_b for $NH_4OH = 1.8 \times 10^{-5}$, $K_w = 1 \times 10^{-14}$)

c) A solution of 0.45 g of urea in 22.5 g of water gave a boiling point elevation of 0.17°C. Calculate the molal elevation constant of water. (M. Wt. of urea = 60 g/mol)

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With Our Best Wishes

Prof. Dr. Ali Ahmed Abdel-Hafez & Dr. Mohamed Abdel megeed

Assiut University
Faculty of Science
Chemistry Department

June: 2016
Time: 2 hours

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

Section (A): Nonorganic Chemistry (25Marks)

Answer the following questions:

First Question: Answer Only Two from the following: (9 Marks)

a) At the start of a reaction, there are 0.249 mol N_2, 3.21×10^{-2} mol H_2 and 6.42×10^{-4} mol NH_3 in a 3.5 L reaction vessel at 200°C. If the equilibrium constant (K_c) is 0.65 at this temperature for the reaction: $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$
Predict, which way the reaction will proceed?

b) The following system is at equilibrium. In which direction (right or left) will the position shift with the following changes:

$3NO\ (g) \rightleftharpoons N_2O\ (g) + NO_2\ (g)$ $\quad \Delta H = +154.9$ KJ

(i) Lowering the temperature (ii) Increasing the pressure of NO
(iii) Adding more N_2O (iv) Increasing the volume

c) It is found experimentally that the solubility of silver chromate (Ag_2CrO_4) is 0.022 g/L. Calculate the value of K_{sp} for silver chromate. (Ag = 107.88, Cr = 52, O = 16)

Second Question: Answer Only Two from the following: (8 Marks)

a) What is the pH of a solution containing 0.30 M HCOOH and 0.52 M HCOOK? ($K_a = 1.8\text{x}10^{-4}$)

b) A 37.0 g sample of a new covalent compound, a nonelectrolyte, was dissolved in 200 g of water. The resulting solution froze at –5.58 °C. What is the molecular weight of the compound? (For H_2O: F.P. = 0.0 °C, K_f = 1.86 °C /m)

c) What is the pH of:

(i) 0.5M CH_3COOH ($K_a = 1.8\times10^{-5}$) (ii) 0.0011 M solution of $Ca(OH)_2$

Third Question: Answer Only Two from the following: (8 Marks)

a) If 200 mL of 0.004 M $BaCl_2$ is added to 600 mL of 0.008 M K_2SO_4. Will a precipitate form? (K_{sp} for $BaSO_4 = 1.1\text{x}10^{-10}$)

b) When one mol of H_2O and one mol of CO are introduced into an empty 5.0 L vessel at 959 K and allowed to come to equilibrium, the equilibrium mixture contains 0.422 mol H_2O. Find K_c and K_p for the reaction: $H_2O\ (g) + CO\ (g) \rightleftharpoons H_2\ (g) + CO_2\ (g)$

c) What are the pH value and percent hydrolysis of a 0.1 M NH_4Cl solution. (K_a for $NH_4^+ = 5.6\text{x}10^{-10}$)

d) Find the osmotic pressure at 15 °C of a solution of naphthalene ($C_{10}H_8$) in benzene containing 14 g of naphthalene per liter of solution.

(At.Wt.: H = 1, C = 12, R = 0.082 atm.L.mol^{-1}.K^{-1})

Assiut University
Faculty of Science
Chemistry Department

June 2016
Time allowed: 2 hours

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

Section (A) (25 Marks)

Answer All the following questions:

First Question: **Answer only TWO from the following:** *(12.5 Marks)*

(a) (i) Two moles of NH_3 are enclosed in five liter flask at 27°C. Calculate pressure exerted by using ideal gas equation and Van der Waals equation.
($a = 4.18\ L^2atm.mol^{-2}$, $b = 0.037\ Lmol^{-1}$, $R = 0.0821\ L.atm.mol^{-1}K^{-1}$)

(ii) Find the molecular weight of a gas if 75 gram of this gas exerts a pressure of 2 atm in 30 liters at 27 °C.

(b) (i) What will be the emf at 25 °C of the following cell:

Zn / Zn^{2+} (0.001M) // Pb^{2+}(0.1M) / Pb

$E°$ for $Pb/Pb^{2+} = -0.13$ V, $E°$ for $Zn/Zn^{2+} = -0.76$ V

(ii) Two gases have molar mass 64 and 100 respectively if diffusion rate of the first is 15 mLs^{-1}, what is the diffusion rate for the second gas?

(c) Consider the reaction: $2Ag\ (s) + Zn^{2+}\ (aq) \longrightarrow 2Ag^{+}\ (aq) + Zn\ (s)$

Where $E°$ for $Ag/Ag^{+} = +0.8$ V, $E°$ for $Zn/Zn^{2+} = -0.76$ V

(i) Write anode and cathode reactions (ii) Write cell diagram

(iii) Predict whether the reaction feasible or not

Second Question: **Answer only three from the following:** *(12.5 Marks)*

(a) State Boyle's law and derive it from kinetic gas equation

(b) Give reason for only four from the following:

(i) A gas can be liquefied by lowering temperature and increase pressure

(ii) Amorphous solids are isotropic

(iii) The viscosity is high at low temperature

(iv) Zinc metal will displace hydrogen from a dilute acid solution

(v) The adsorption power of the adsorbent is enhanced by activation

(c) (i) What is meant by only three from the following?

Critical temperature – Density – Electro-osmosis – Reduction

(ii) How can you prepare colloidal solution of sulphur

(d) Compare between physical and chemisorption.

انظر خلفه باقى الاسئلة

Section (B) (25 Marks)

Answer the following questions:

First question*: *(13 Marks)

(a) Draw the energy level diagrams for C_2^{-2} and O_2^{+} molecules. Calculate the bond order and predict the magnetic properties for each one. (5 Marks)

(b) Put Yes (√) or No (x) for each of the following: (4 Marks)

(i) CO_2 molecule is polar while H_2O molecule is nonpolar ( )

(ii) The hybrid orbitals for S in SF_6 are sp^3d^2 ( )

(iii) The geometrical structure of $BeCl_2$ is linear while in SO_2 is bent ( )

(iv) For Paschen series $n_1 = 3$, $n_2 = 3, 4, 5, \ldots\ldots$ ( )

(c) Draw Lewis structures and assign formal charge to each of the following: (4 Marks)

(i) $POCl_3$ (ii) O_3

Second question*: *(12 Marks)

(a) Complete the following: (4 Marks)

(i) The de Broglie equation for the electron is .....

(ii) The hybridization of C in CH_4 molecule is .....

(iii) The bond order in B_2 is equal .....

(iv) The formal charge on S in SF_4 is .....

(b) Give reasons for the following: (3 Marks)

(i) The bond angle in NO_2^- (115°) is less than that of NO_2 (134.1°).

(ii) He_2 molecule does not exist while He_2^+ exists.

(c) Using VSEPR theory, predict the electron domain geometries and molecular shapes for NF_3, CO_2 and H_2O. (5 Marks)

(Atomic No. B = 5, C = 6, N = 7, O = 8, F = 9, P = 15, S = 16)

Good Luck

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