كيمياء حيوية - الكربوهيدرات - الفرقة الثانية ٢٠١٥

Mansoura university
Faculty of science
Chemistry Department
Subject : Biochem.271
Course : Biochemistry of carbohydrates

First Term Exam 2014/2015
Second Level BioChem Students
Date : 21 Dec, 2014
Time Allowed : 2 hours
Total Mark : 80 Marks

Answer the following questions

Provide your answer with formula, equations, pathways, figures or tables wherever possible

[1] A) **Write the following biotransformations:** (30 marks)

1- Ruff degradation and kiliani-Fisher synthesis
2- Formation of ozazone with fructose
3- Effect of bromine water and oxygen on glyceraldehydes
4- Effect of conc.H_2SO_4 and conc.HCl on D-galactose
5- Effect of conc. HNO_3 on D-fructose

[2] A) **Give the structure and ONE important function for each of the following:** (16 marks)

1- Chondratin sulphate C
2- Heparin
3- Chitin
4- Hyaluronic acid

B) Give an account of the types and functions of most important glucose transporters. Explain the types of glucose transporter through intestinal brush border membrane. (14 marks)

[3] A) **Put (√) for write sentence and put (X) for wrong sentence:** (10 marks)

1)Stereoisomerism is molecules having the same structure but differ in position of their different groups ant atoms in the space.
2)Reduction of fructose gives sorbitol and mannitol.
3)Ribose and arabinose both gave erythrose on ruff-degradation.
4)Erythrose gave a mixture of ribose and arabinose on Killiani-Fischer synthesis.

5)Arabinose gave a mixture of glucose and mannose on Killiani-Fischer synthesis.

6)Lactose is non-fermentable due to absence of lactase enzyme from yeast.

7)Sucrose is non-ozazone forming, not mutarotating and non-reducing sugar.

8)Amylopectin is the inner part of starch granules and is water soluble and give blue color with iodine.

9)Starch is the stored form of carbohydrates in animals.

10) Glucose transport via (gluT4) in the muscle cells and adipocytes is not under the control of insulin.

B) MCQ's : (10 marks)

1-the most important epimer of glucose is:

A-Galactose B-Arabinose C-Xylose D-Fructose

2-α-D-glucose and β-D-glucose are:

A-Anomers B-Stereoisomers C-Epimers D-Keto-aldo pairs

3-A pentose sugar is:

A-Ribulose B-Dihydroxyacetone C-Erythrose D-Glucose

4-Which of the following is a non-reducing sugar:

A-Trehalose B-Isomaltose C-Lactose D-Maltose

5-A disaccharide formed by 1,1-glycosidic linkage between their monosaccharides:

A-Trehalose B-Sucrose C-Lactose D-Maltose

6-The sugar alcohol is:

A-Xylulose B-Arabinose C-Trehalose D-Mannitol

7-The sugar found in milk:

A-Glucose B-Galactose C-Fructose D-Lactose

8-The polysaccharides used in assessment of glomerular filtration rate (GFR) is:

A-Agar B-Glycogen C-Hyaluronic acid D-Inulin

9-The polysaccharides found in the exoskeleton of invertebratesis:

A-Pectin B-Agar C-Cellulose D-Chitin

10-Hyaluronic acid is found in:

A-Brain B-Abdomen C-Mouth D-Joints

GOOD LUCK **Prof. Abdel-Aziz Fatouh**

الفصل الثاني - كيمياء حيوية - الأحماض الأمينية والبروتينات لعام ٢٠١٤

	Mansoura University **Faculty of Science** **Chemistry Department**
First Term **Second Level Biochemistry** **Course Title: Biochemistry of amino acids and proteins** **Code No.: Biochemistry 273**	**Date: 24/ 12/ 2014** **Time allowed: 2 Hours** **Full Mark: 60 Marks**

Answer the following questions

Q1: (21 Marks)

A- Give a brief account on the following:

i- Preparation of alanylglycine through carbobenzoxy chloride reaction.
ii- Effect of pH on the solubility of protein.
iii- Structure of collagen and the related diseases.
iv- Emphysema.
v- The amino acids that disrupt the helix.
vi- Differences between globular and fibrous proteins.
vii- Principles of salting out effect in protein purification.

Q2: (9 Marks)

A- Mark true (√) or false (x) and correct the false one: (4 Marks)

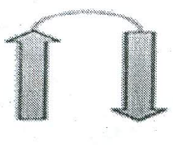
i- The isoelectric point of a specific protein solution of different ionic strengths will be the same.
ii- In ion exchange chromatography, the greater the binding affinity of a protein for the ion exchange column, the more faster eluting it off from the column.
iii- In gel-filtration chromatography, the separation of proteins is on the basis of polarity.
iv- Mellon's test is characteristic for arginine.

B- Complete the following: (5 Marks)

i- In gel-filtration chromatography, the sample is applied to the top of a column consisting of ..... made of an insoluble but highly hydrated polymer such as ..... or ..... or.....
ii- The destruction of secondary, tertiary, or quaternary structures of a protein through conformational changes is by a process called .....

Q3: (30 Marks)

A- Identify, classify according to the protein structure, and write the corresponding biological role of each of the following figures if possible: (16 Marks)



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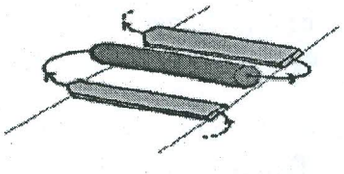

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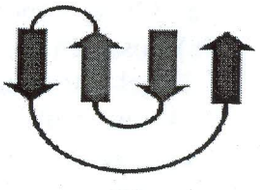

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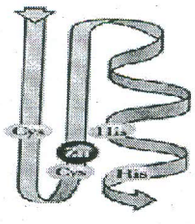

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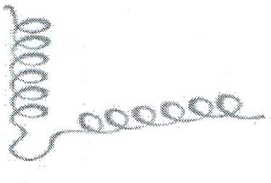

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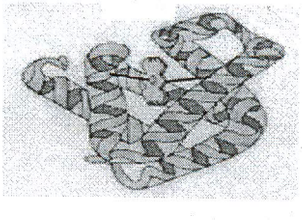


(h)

B- Choose the correct answer: (14 Mark)

1- When the pH = pKa, the ratio of conjugate base to acid is .....
a) 1:1000. b) 1:10.
c) 1:1. d) 10:1.
e) none of the above.

2- According to the Henderson-Hasselbach equation, pH= pKa + log[A-]/[HA].When the pH is 3 points higher than the pKa, the ratio of conjugate base to acid (i.e. [A-]:[HA]) is .....
a) 1:100. b) 1:1000.
c) 1000:1. d) 3:1.
e) none of the above.

3- All these salt ions salting out the system by strengthen the hydrophobic interactions, **except:**
a) NH_4^+. b) $N(CH_3)_3^+$.
c) HPO_4^{2-}. d) SCN^-.

4- One of these tests gives positive result with phenylalanine:
a) Sakaguchi reaction. b) Mellon's test.
c) Xanthoproteic acid test. d) Pauly's reaction.

5- All these are medicinal applications of plasma proteins fractionation, **except:**
a) Fibrinogen injections. b) γ–globulin fraction injections.
c) Albumin fraction injections. d) globin fraction injections.

6- One of these is not metalloprotein which is.....
a) Ceruloplasmin. b) Catalase.
c) Ferritin. d) α-globulin.

7- The primary determinant of the secondary structure of polypeptides is:
a) Hydrogen bonding between peptide groups
b) The hydrophobic effect
c) Covalent bond formation during the folding process
d) Attractive interactions between side groups of amino acid residues

8- Are often present in β-turns:
a) Valine and cystine. b) Arginine and tyrosine.
c) Proline and lysine. d) Proline and glycine.

9- Quaternary structure results from aggregation of two or more polypeptide subunits held together by the following, **except:**
a) Disulphide bridges. b) Ionic bonding.
c) Hydrophobic interactions d) H-bonding.

10- The tertiary structure of protein is stabilized by the below forces, **except:**
a) Salt bridges. b) hydrogen bonds.
c) ionic bonds. d) disulfide bridges.

11- Is often present in nucleotide-binding proteins:
a) β-hairpin motif. b) Zinc finger motif.
c) Rossman Fold. d) Domains.

12- In gel-filtration chromatography,
a) small molecules flow more rapidly. b) Large molecules will exit last.
c) large molecules take a tortuous path. d) large molecules flow more rapidly.

13- Sephadex is a bead-formed gel prepared by cross-linking dextran with.....
a) formamide. b) dimethylsulfoxide.
c) epichlorohydrin. d) 2, 3-dibromopropanol.

14- DEAE cellulose anion exchanger contains charged groups which interact with:
a) positively charged proteins. b) all charged proteins.
c) negatively charged proteins. d) only bipolar ions.

The questions are finished

With my Best Wishes *Examinar: Dr. Nivin A. S. Islam*

ع كيمياء حيوي
كيمياء الجزيئات الحيوية للبسا = لوح ٢٧٢

	Mansoura University Faculty of Science Chemistry Department
First Term Second Level Biochemistry Course Title: Chemistry of Lipids Code No.: Biochemistry 272	Date: 28/ 12/ 2014 Time allowed: 2 Hours Full Mark: 80 Marks

Answer the following questions

Q1: (24 Marks)

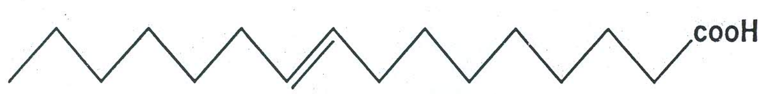
A- Write briefly on each of the followings:
- **i- Giometrical isomerism of unsaturated fatty acids.**
- **ii- Prostaglandins (PGs)** structure and function.
- **ii- Barth syndrome**
- **iv- Steps and mechanism of lipid peroxidation (illustrate by equations only).**
- **v- Micells.**
- **vi- Biosynthesis of primary bile acids.**

Q2: (18 Marks)

A- Draw each of the following structures: (6 Marks)
- **i- Cephalin.**
- **ii- Plasmalogens.**
- **iii-Phosphatidylinositol**
- **iv- Sphingomyelins.**

B- Name each of the following structure by different systems: (12 Marks)

i-



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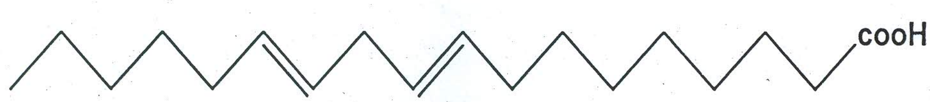

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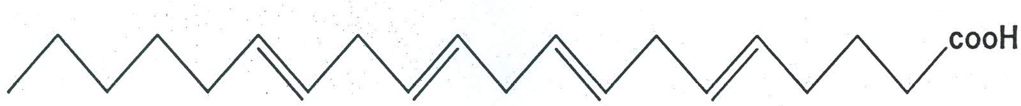


Q3: (22 Marks)

A- Mark true (√) or false (x) and correct the false one(s):

i- If the fatty acid residues of triacylglycerol are 18:3, it is liquid to below 0 temp.
ii- The melting points of even-numbered fatty acids are directly proportional to unsaturation.
iii- As the chain length of fatty acid increases, the melting point becomes higher.
iv- The membrane lipids, which must be fluid at all temperatures, are more saturated than storage lipids.
v- In cholesterol the methyl groups are attached to C10 and C13 are in the β–configuration.
vi- The desirable LDL cholesterol should be < 100 mgldl.
vii- Total cholesterol is only the sum of HDL and LDL.
viii- During partial hydrogenation, unsaturated fatty acids can be isomerized from trans to cis configuration.
ix- Hardening process means the conversion of unsaturated fatty acids to saturated ones of higher melting points.

x- The predominant lipid of LDL and HDL is triglycerides.
xi- HDL carry cholesterol from the liver to cells of the body.

Q4: (16 Marks)

B- Complete each of the following:

i- Prostacyclins are made from .....but contains.....
ii- Thromboxanes produced from..... but contains.....
iii- .....is a major lipid of mitochondrial membranes.
iv- On hydrolysis, sphingomyelins yield.....,.....,.....and.....
v- The major glycolipids found in all animal tissues paticularly in nervous tissues and brain are.....
vi- The simplest ganglioside found in tissues is GM_3, which consists of:
1-..... 2-.....
3-..... 4-.....
vii- Before the primary bile acids are secreted into the canalicular lumen, they are firstly conjugated to.....or.....

The questions are finished

With my Best Wishes *Examinar: Dr. Nivin A. S. Islam*

كيمياء حيوية - (لفرقة الثانية) البروتينات وتطبيقاتها

Mansoura University
Faculty of Science
Chemistry Department
Subject: Biochem. 274
Course(s): Chemistry of Nucleic acids- Prophyrins and their chemical applications

First Term
Final Exam
Second Level (Biochemistry)
Date: 21st January 2015
Time Allowed: Two hours
Full Mark: 80 Marks

Answer ALL the Following Questions in the two pages

[1] Write about Measures to increase efficacy of PDT AND the properties of ideal photosensitizer. [27 Marks]

[2] A- Show aminolevulinic acid – based photodynamic therapy and advantage and disadvantage of ALA – PDT. [13 Marks]

B- Choose the Most Correct Answer and Rewrite the Complete Sentence:

i- Adjacent nucleotides are joined by
(a) covalent bond (b) phosphodiester bond (c) ionic bond (d) peptide bond

ii- The basic repeating units of a DNA molecule are
(a) nucleotides (b) nucleosides (c) amino acids (d)histones

iii- Cytarabine, the anti-cancer agent, is composed of
(a) cytosine + ribose
(b) cytosine +2□-deoxyribose
(c) cytosine +arabinose
(d) cytosine + xylose

iv- The length of one turn of DNA is
(a) 3.4 Å (b) 34 Å (c) 20 Å (d) 3.04 Å

v- Chromatin is composed of
(a) nucleic acids and proteins
(b) nucleic acids only
(c) proteins only
(d) none of these

vi- Codons are present in
(a) Template strand of DNA
(b) tRNA
(c) mRNA
(d) rRNA

vii- Which of the following is the complementary sequence of 5′-TTAAGCGTAC-3′
(a) 5′-TTAAGCGTAC-3′
(b) 5′-AATTCGCATC-3′
(c) 5′-CATGCGAATT-3′
(d) 5′-GTACGCTTAA-3′

[7] Marks

C- State whether each of the Following Statements is True or False and Correct the false one(s):

i- Avery, MacLeod, and McCarty discovered that RNA is the fundamental unit of the transforming principle of *Pneumoccocus* Type III.

ii- Azathioprine is a metabolite of a drug used to supress events involved in immunological rejection during organ transplantation.

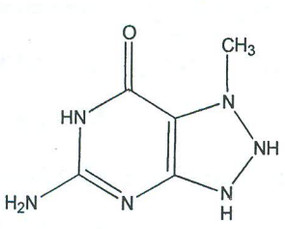
تابع باقى الأسئلة

iii- Tyrosinyl-tRNA synthetase forms an activated intermediate of phenylalanyl-AMP-enzyme complex which recognises a specific tRNA.

iv- DNA exists as a single strand, whereas RNA exists as a double-stranded helical molecule.

[6] Marl

[3] A- The following are some abnormal bases found in nucleic acids:



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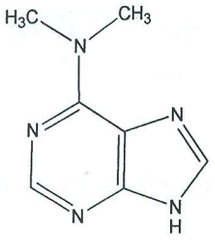

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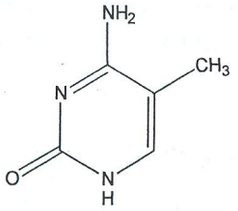

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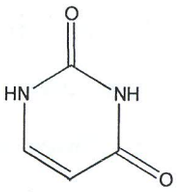

(d)

i- Give the name of each base, the type and source of the nucleic acid in which it occurs. [6] Marks

ii- Illustrate with diagram(s) where (a) and (d) are attached to nucleic acids. [10] Marks

B- DNA replication is the process by which DNA makes a copy of itself.

i- Discuss the role played by each of the following enzymes during DNA replication:
(a) DNA helicase
(b) DNA polymerase
(c) DNA ligase

[4.5] Marks

ii- How does DNA synthesis upon the RNA primer take place?

[6.5] Marks

Examiners: Prof. Dr.Mohamed El-Far **Dr.Ahmed EL-Sokkary**

-Good Luck-

Mansoura University Faculty of Science Chemistry Department Subject code: Chem.211 Course: Volumetric analysis		First term examination 2nd level students Program: Chemistry, Biochemistry Date: 18/1/2015 Time allowed: 2 hours Full mark: 60 marks

Question 1: Choose the correct answers only (20 marks)

1-Determine the number of moles of $Ba(OH)_2$ needed to neutralize **2 moles of HCl**:

a-1 **b-2** c-3 **d-4**

2- 15, 71% (w/w) H_2SO_4 solution its density 1.2 g/ml. The **normality** of this solution is :

a) 3,8 b) 7.0 c) 1.7 d) 0.38 (H = 1 , S= 32, O=16)

3- 128.1g of NaCl dissolved in 700ml of water, the **molarity** of this solution is :

a)5.013 b) 3.13 c) 0.13

4-the chemical formula of the compound formed at the end point in Mohr's method is:

a- Ag_2CrO_4 b-$Ag_2Cr_2O_7$ c-$AgNO_3$ d-AgCl

5- The number of **moles** for 200 mL of **2N** H_2SO_4 is:

a- 1.00 b- 0.2 c- 2 d- 0.4

6-A 50.00ml sample weig 46.0 g .the density (**g/ml**) is:

a- 0.92 b- 0.920 c- 0.9200 d- 1.087

7- pOH of 0.2M $Li(OH)_2$:

a- (-log 0.1) b- (-log 0.2) c- (-log 0.4) d- (-log 0.8)

8- If 200ml of 0.1M HCl is mixed with 50ml of 0.1 M $AgNO_3$. pCl is :

a)1.2 **b) 4.00** **c) 0.6** **0.2**

9- Mohr's titration shouldn't be carried out at pHs:

a)3 b- 7 c - 12

10-The unit of strength is:

a-mol/L b-mol/kg c-unitless d- mg/ml

Question 2

I-Discuss two methods used for Fe^{2+} determinations. **(5marks)**

II- In titration of 50 ml 0.1M CH3COOH with 0.05 M NaOH calculate pH of solution at the following additions : a) 0.0 ml b) 5 ml c)100 ml d) 120ml ($K_a = 1.8x10^{-5}$) . **(5marks)**

III- Discuss two methods only used for detection of the end point in precipitation titrations (argentometric titration). **(5 marks)**

Question 3: Choose three only. **(15marks)**

1- The success of an EDTA titration depends upon the precise determination of the end point.

2-The complexing action of EDTA is unselective.

3) A sample of NaCL weights 0.5g. 50ml of o.21M $AgNO_3$ is added to precipitate AgCl. The excess silver nitrate is titrated with 0.28M potassium thiocyanate to give 25.5 ml at the end point .Find the percentage of NaCl in this sample. (Na=23,Cl=35.5)

4) - Discuss colour change intervals of neutralization indicators.

5) Prove that pH = pKa + log [salt] / [acid] for a buffer solution.

Question 4.

1-Define the following:

a) Accuracy and precision. b) Nernest equation

. c) Buffer solution and buffer capacity. **(4marks)**

2- **The world permissible limit** of Pb in food must not exceed than 0.5 ppm (0.5mg/Kg). In the analysis of fish sample weighing 113g, it was found to contain 0.11mg Pb. **(3marks)**

a) Find the concentration of Pb in the fish sample expressed as ppm

b) Does the Pb concentration in the fish sample lie within the permissible limit?

3- A given analytical test was performed five times. The results of the analysis are represented by the following values. 6.738, 6.738, 6.637, 6.739and 6.738% would you say that these results are precise?. If the standard deviation is 0.012 and t, value =4.1, Find **the confidence limt** and **RSD%** . **(3 marks)**

With our best wishes
Prof. Dr.M.El- Defrawy
Prof.Dr. Magda Akl

كيمياء
كيمياء + مجموعة البيولوجي - ف ١١١ ضوء فيزيائي
فيزياء

Mansoura University | **First term Exam, 11/1/2015**
Faculty of Science | **2nd level**
Physics Department | **Time allowed : 2 hours**

Full mark : 80 marks

Subject : physics | **Course : 221ف Physical optics**

Answer the following questions:

1- a) Demonstrate an explanatory diagram of the optical arrangement of Newton's rings interferometer. Drive the necessary formula of these rings. Discuss the forming of the dark spot in the center of these rings. Explain how the wavelength of the unknown monochromatic source can be measured using this interferometer.

(20 marks)

b) When a thin sheet of transparent material of thickness 6.3×10^{-4} cm is introduced in the path of one of the interfering beams, the central fringe shifts to a position occupied by the sixth bright fringe. If $\lambda = 5460$ A°, find the refractive index of the sheet.

(7 marks)

2- a) If the disturbances are produced at a given point by to coherent sources separately given by:

$$y_1 = a \sin(wt - \alpha_1) \quad \text{and} \quad y_2 = a \sin(wt - \alpha_2)$$

Deduce an expression for the intensity at a given point when both sources interfere. Sketch a plot of this intensity as a function of the phase difference $\delta = (\alpha_1 - \alpha_2)$.

(20 marks)

b) Explain a method to produce the beam of plane polarized light.

(7marks)

3- a) Give a model to discuss the intensity distribution of Fraunhofer diffraction pattern when using a rectangular slit.

(20marks)

b) What should be the total number of lines, a grating must have in order to just separate the sodium doublet ($\lambda_1 = 5896$ A°, $\lambda_2 = 5890$ A°) in the first order?

(6 marks)

With my best wishes

Prof. Dr. Taha Sokkar

لطلاب كيمياء الفائقة

Mansoura University Faculty of Science Chemistry Department Subject: Inorganic Chemistry CHEM 221 (s&p-Block elemnets)		First Semester 2nd Level Biochemistry Students Date: 4th Jan. 2015 Time: 2 hours Marks: 80

Answer The Following Questions

I) Comment on (7 only) of the following:- **(28 marks)**

1) The reactivity of elements of **Group IA** with water increases**down** the group.
2) The 1st Ionization Energy (1st IE) of **($_{12}$Mg, $_{15}$P and $_{18}$Ar)** is high **while** for **($_{16}$S)** is low.
3) Berylium metal is amphoteric **whereas** aqueous solutions of Be(II) salts are acidic.
4) Boron trifluoride **(BF_3)** is Lewis acid.
5) The size of sodium ion **(Na^+)** is smaller than that of sodium atom **(Na),while** that of **Cl^-** is larger than **Cl.**
6) In aqueous solutions, cesium ions **(Cs^+)** conduct electricity more than **(Li^+)**, **while** the crystalline salts show decrease on the hydration.
7) Thallous (I); **$_{81}Tl^+$** compounds are stable.
8) **B_2O_3** shows amphoteric behaviour.

.....

II) A- Write shortly on (4 only) of the following:- **(20 marks)**

1) Separation of Aluminium metal **(Al)** from **bauxite ore{(AlO(OH)}.**
2) Plant fertilizers are normally containing **three main ingredients;** (Nitrogen, Phosphorous and Potassium).
3) The production of **nitric acid (HNO_3)**by **Ostwald process**

4) Photodissociation of nitrogen dioxide (NO_2) and photochemical smog.

5) Isolation of pure silicon **(Si)** from **silica** (SiO_2).

6) In aqueous solution, addition of **glycerol to** $B(OH)_3$, makes the later strong monobasic acid.

.....

II) B-Complete(6 only) of the following chemical equations:- **(8 marks)**

1) $Ba + O_2$(at 500 °C) →

2) $CH_4 + H_2O$ (Ni, 1000 °C) →

3) $CaC_2 + H_2O$ →

4) $Al_4C_3 + H_2O$ →

5) $KO_2 + H_2O$ →

6) $Ca(H_2PO_4)_2 + NaHCO_3$ (300 °C) →

7) $P_4O_{10} + H_2SO_4$→

8) $NH_3 + CO_2 + H_2O + NaCl$ →

.....

III) Answer (3 only) of the following:- **(24 marks)**

1) **Give an account for ortho and para hydrogen.**

.....

2) **Diamond and graphite** are **two allotropic forms** of carbon, **compare between these two forms.**

.....

3) **Describe the structure and bonding of Diborane (B_2H_6). (Atomic No: $_5B$)**

.....

4) **Explain how Silicon can be converted to semiconductors (n-type & p-type). Draw the three Figures. (Atomic No: $_5B$, $_{14}Si$, $_{15}P$)**

.....

Best wishes

Prof. Kamal Ahmed, Prof. Gabr Abou El Reash, Prof. Tawfik Rakha, Prof. Sahar Mostafa