المستوى الثالث . كيمياء حيوى - ك ٣٢٣ كيمياء تناسقية وكيمياء العناصر الانتقالية (١)

Mansoura University	First-Term
Faculty of Science	Third Level
Chemistry Department	Date: 23/12/2013
Courses(s): Chem. (323)	Time Allowed: 2 hours
Biochemistry& Zoology	Full Mark: 80 Marks

1. a- Write the structural formula for each of the following complex and indicate the possible isomers: (10 Marks)

   i. Hexaaquatitanium(III)chloride.
   ii. Pentaaminenitrocobalte(III)chloride.
   iii. μ-dihydroxobis(aminetrichloroiron(III)).
   iv. Potassium diaminetetrachloronickelate(II).
   v. Tetraamine platinium(II)tetrachloroplatinate(II).

   b- Name the following complexes: (10 Marks)

   i. $Na[CrO_4]$
   ii. $[Co(NH_3)_4CO_3]NO_3$
   iii. $K_3[Fe(C_2O_4)_3]. 3H_2O$
   iv. $[Cr(py)_2(H_2O)Cl_3]. H_2O$
   v. $[(NH_3)_3Co-(OH)_3-Co(NH_3)_3]$

2. a- Give one example of the following: (10 Marks)

   i. Neutral bridging ligand.
   ii. Neutral tridentate ligand.
   iii. Preparation of complex by substitution reaction.
   iv. A square planar complex with no dipole moment.
   v. Mononongative bidentate ligand forming five membered ring.

   b- Complete the following sentences: (10 Marks)

   i. A ligand may be an atom, ion or molecule which attached to the central metal atom by .... or .... bond.
   ii. Chelates rings are most stable when they have ...... or .... including the metal ion.
   iii. Compounds with the same .... but, different structural arrangements are called. . . .
   iv. Cations which serves best as centre for coordination are the ones with .... & ....
   v. The ligand which forms .... with two metal atoms is called .... ligand.

Please turn out

3. a- Complete the following sentences: (10 Marks)

i. Zr and Hf have nearly the same size due to ..... .

ii. Many transition metals and their compounds have ..... properties.

iii. The rusting of iron is a special case of ....., where ..... compound is formed, which can be prevent by ..... and ..... .

iv. The $[Mn(H_2O)_6]^{2+}$ complex has ..... color, because d-d transition is ....., while, the $[Mn(CN)_6]^{4-}$ complex has ..... color, because d-d transition is .....

v. Cobalt is extracted from Co_3O_4 by ..... reaction, while titanium is extracted from $TiCl_4$ by ..... process.

b- True and false (circulate the correct response) : (10 marks)

i. T – F V_2O_5 is amphoteric oxide.

ii. T – F Mn(IV) is more basic than Mn(VII).

iii. T – F Cobalt chloride used for detection of water or moisture.

iv. T – F $[Fe(CN)_6]^{2-}$ complex is used for testing urine-sugar.

v. T – F Cr(III) acetate is a diamagnetic compound.

4. a- Arrange the following according to the listed property: (10 Marks)

i. Reactivity: La , Sc , Y

ii. Size of atom: Ti , V, Sc

iii. Melting point: Hg , Cd , Cu

iv. Basic character: VO , VO_2 , V_2O_3

v. Magnetic properties: Ti^{3+} , Cr^{3+} , Sc^{3+}

b- Complete the following reactions: (10 Marks)

i. $Sc + H_2 \rightarrow$ .....

ii. $Mn + O_2 + \Delta \rightarrow$ .....

iii. $TiO_2 + NaOH \rightarrow$ .....

iv. $2\ VCl_4 \rightarrow$ ..... + ...

v. $MnO_2 + HCl \rightarrow$ ..... + ... + ...

Best Wishes

Prof. Dr. Magdy Bekhite

Dr. Ola A. El-Gammal

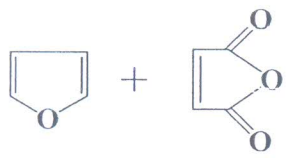
Dr. Rania R. Zaky

^{21}Sc	^{22}Ti	^{23}V	^{24}Cr	^{25}Mn	^{26}Fe	^{27}Co	^{28}Ni	^{29}Cu	^{30}Zn

Mansoura University Faculty of Science Chemistry Department Subject: Chemistry Course(s): Org.Chem.337		1st Term 3rd Level Students Date: 26 / 12 / 2013 Time Allowed: 2 Hours Full Mark: **80** Marks

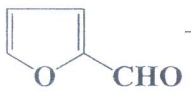
Answer All Questions

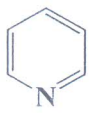
1- Suggest the organic product(s): **[27 Marks]**

i)  heat ⟶ .....

ii) $2CH_3COCH_2COOEt + CH_3CHO + NH_3$ ⟶ ..... $\xrightarrow{HNO_3}$ .....

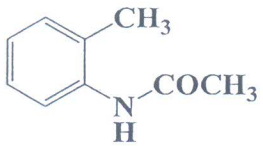
iii)  + $CHCl_3$ $\xrightarrow{NaOH}$ .....

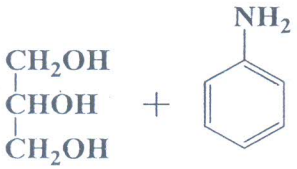
iv)  alc. KCN ⟶ ..... [O] ⟶ .....

v)  + PhLi ⟶ .....

vi) $H_2C{=}\underset{H}{C}{-}CHO + NH_2NH_2$ ⟶ .....

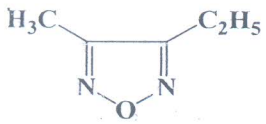
vii)  $\xrightarrow[POCl_3]{DMF\ /}$ ..... $\xrightarrow[reduction]{wolf\text{-}Kischner}$ .....

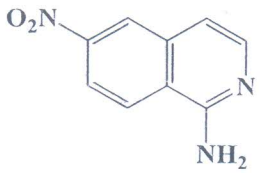
viii)  $\xrightarrow{Me_3CO^-}$ ..... $\xrightarrow{H^+}$ .....

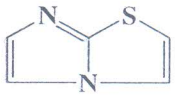
ix)  + conc. H_2SO_4 ⟶ ..... $\xrightarrow{PhNO_2}$ .....

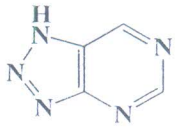
P. T. O.

2- a) Give acceptable name of each of these heterocycles: [8 Marks]

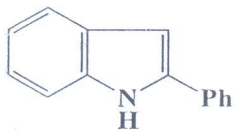
i) 

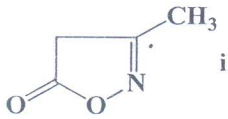
ii) 

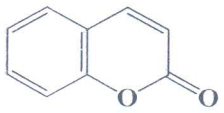
iii) 

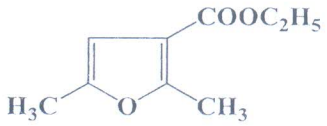
iv) 

b) Design one synthesis for each of the molecules below: [18 Marks]

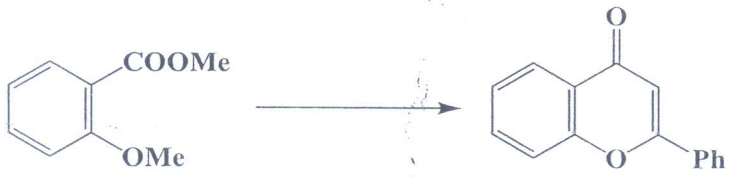
i) 

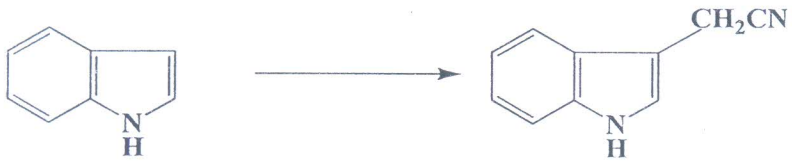
ii) 

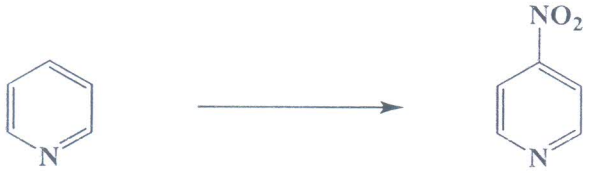
iii) 

iv) 

3- a) Diagram these conversions: [9 Marks]

i) 

ii) 

iii) 

b) Show the following: [18 Marks]

i) Conversion of pyridine to penta-1,3-diene

ii) Preparation of saccharine

iii) Pictet-Spengler synthesis of isoquinoline

iv) Paal-Knorr synthesis of pyrrole

Best Wishes and Good luck

Examiners: Prof. Dr. Ez Kandil, Prof. Dr. Evelin Boshra, A.Prof. Dr. Eman Keshk

المستوى الثالث كيمياء حيوى . الهرمونات ج ٣٧٢

Mansoura University
Faculty of Science
Chemistry Department
Subject: Chemistry
Course(s): Hormones
Biochem 372

3rd Level Biochemistry Students
Date : Jan. 2014
Time Allowed : 2 hours
Full Mark: 60 Marks

ANSWER THE FOLLOWING QUESTIONS

I. [25 Marks]

a) Describe the mechanism of hormonal action, and discuss the role of G coupled protein. [12.5 Marks]

b) Briefly explain the steps of the synthesis of thyroid hormones. [12.5 Marks]

II. Do as shown between brackets: [20 Marks]

1) Hypothalamus-Pituitary-Endocrine Axis **(Define).**
2) Growth hormone promotes body growth. **(Describe)**
3) Hormone Response Element. **(Define and state the function)**
4) Thyrotropin-releasing hormone **(Draw the structure and show the clinical significance)**
5) Many factors affect the concentration of a hormone at the target cell **(Define target cell and state the factors).**

III. Put true or false in front of the following statements and correct the false ones. [15 Marks]

1. The secretion of thyroid stimulating hormone is inhibited by somatostatin.
2. Adrenocorticotropic hormone stimulates the cells of the adrenal cortex to produce mineralocorticoids.
3. The rate limiting step in catecholamine biosynthesis is hydroxylation of phenyl alanine.
4. An over production of vasopressin leads to excessive loss of urine, a condition known as diabetes insipidus.
5. Parathyroid hormone enhances the absorption of calcium in the intestine by increasing the production of activated vitamin D.
6. Glucagon acts on the liver where it stimulates the conversion of glucose into glycogen.

باقي الأسئلة في الخلف

7. Growth hormone is a lipophobic hormone which requires kinase or phosphatase cascade as a second messenger.
8. Testosterone is an anabolic hormone, which increases the protein synthesis and muscle mass.
9. In adrenal gland, zona fasciculata is the main site for production of mineralocorticoids, while zona glomerulosa is responsible for producing glucocorticoids.
10. Aldosterone stimulates K^+ and water reabsorption from the gut, salivary and sweat glands.
11. The deficiency of Monoamine oxidase A increases the bioavailability of catecholamines.
12. Pheochromocytoma is caused due to the hyposecretion of catecholamines.
13. Insulin is a homodimeric polypeptide with one intrachain and two interchain disulfide bridges.
14. Amylin tends to decrease the level of blood glucose through inhibition of glucagon secretion.
15. Glucocorticoids inhibit the enzymes involved in gluconeogensis and enhance glucose uptake in muscles and adipose tissue.

Best wishes for our dear students,

Dr. Amr Negm

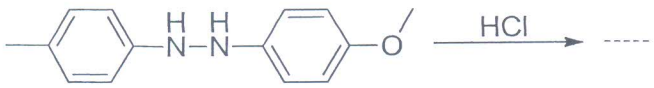
المستوى الثالث كيمياء حيوى - كيمياء عضوية فيزيائية ٢٣٦ ك

Mansoura University Faculty of Science Chemistry Department Subject: Chemistry Course(s): Chem.336 Physical Organic Chemistry		First Term 3rd Level Biochem Students Date: Jan. 2014 Time Allowed: 2 Hours Full Mark: **80** Marks

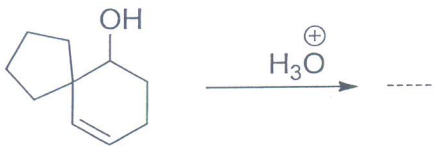
Answer All Questions

Question 1 **(30 marks)**

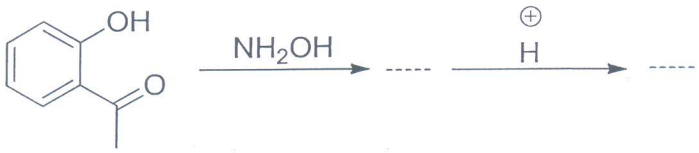
1) Write the major product from the following reactions. Explain the suitable mechanism for each one. (20 marks)

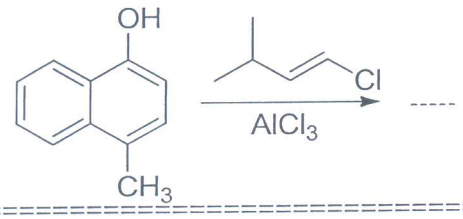
a) 

b) 

c) 

d) 

e) 

f) 

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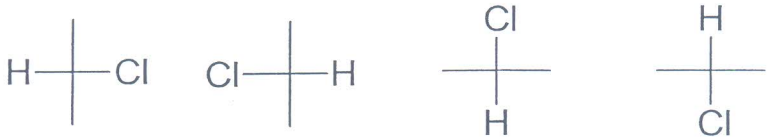
2) Complete each of the following structures so that all represent ***R*-2-chlorobutane**.



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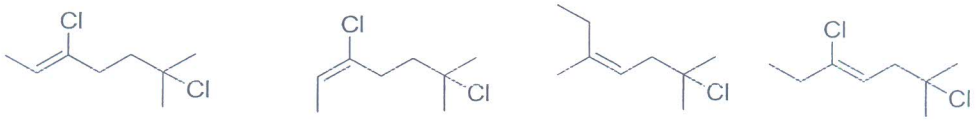
3) Which of the following represents **(*E*)-3,6-dichloro-6-methyl-3-heptane**? Explain?



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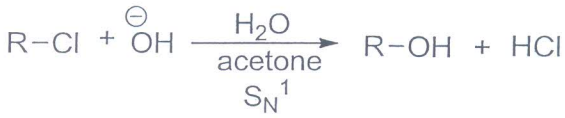
Question 2 (25 marks)

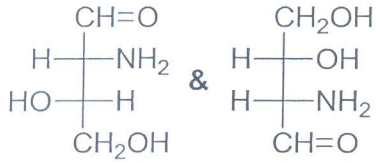
A) The table represents the kinetic data for the following reaction:

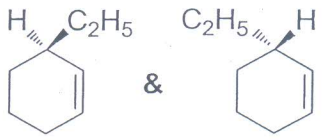


R	-CH(CH$_3$)$_3$	CH$_2$=CH-CH$_2$-	Ph-CH$_2$-	CH$_3$OCH$_2$CH$_2$-
K	1	90	250	0.2

Give comments on above data?

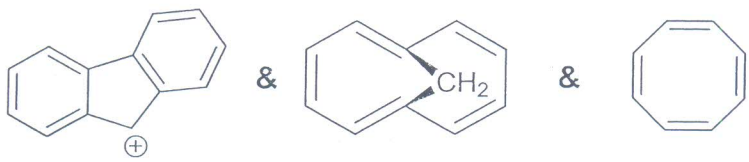
B) Indicate whether the following pairs of compounds are identical, enantiomers, diastereomers, or structural isomers?

1) 

2) 

3) 

C) Predict with discussion the following structures are aromatic, antiaromatic or nonaromatic?



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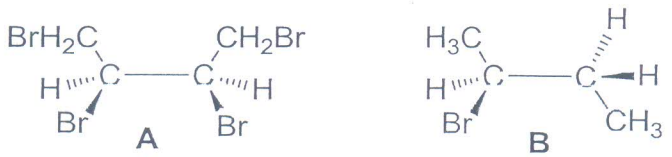
Question 3 (25 marks)

A) What is plane-polarized light? How is it produced?

B) Draw all the stereoisomers of 1,3-dibromo-2-methylbutane and give the stereochemical relationships of the stereoisomers?

C) Draw *meso* 3-bromo-2,4-dichloropentane in the Fischer representation?

D) Explain why compound **A** has no enantiomer and why compound **B** has no diastereomer?



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With my best wishes Dr. A. El-Mekabaty

لعح ٣٧١ ٣ كيميا، حيوي - الانزيمات

lansoura University
aculty of Science
hemistry Department
ıbject: Biochemistry
ourse: Enzymes, Biochemistry 371

First Term Examination
3rd Level Students
Date Jan 9, 2014
Time Allowed: Two hours
Full Marks: 60 Marks

Answer the following questions

I. Explain each of the followings: ***(15 Marks)***

a) Effects of pH on enzyme activity.
b) Protein kinases and phosphatases in regulation of enzyme activity.
c) Use of dicoumarol as an anticoagulant.

II. Compare between each of the following and Give one example for each:***(15 Marks)***

a) Ping pong and sequential random reactions.
b) layses and oxidoreductases enzymes.
c) Functional and non functional plasma enzymes

II. ***(10 Marks)***

a) Define the Km and the Vm in Case of competitive and non-competitive inhibitors by drawing using the double reciprocal plots.**(5 Marks)**
b) Enumerate the enzymes used in diagnosis of Myocardial Infarction.**(5 Marks)**

III- ***Choose the best answer: (20 Marks, 2 for each)***

1. If Km is large, which of the following reactions is favored?
   (a) ES →E + S
   (b) E + S →ES
   (c) ES + I →EI + S
   (d) EI + S →ES + I
2. The zymogen chymotrypsinogen is converted to active chymotrypsin by
   (a) binding of a necessary metal ion
   (b) reduction of a disulfide bond
   (c) proteolytic cleavage
   (d) phosphorylation of an amino acid side chain
   (e) the action of a signal peptide peptidase
3. Allosteric inhibition of an enzyme involves which of the following?
   (a) Binding of an inhibitor to a site other than the substrate binding site
   (b) Binding of an inhibitor competitively to the substrate binding site
   (c) Binding of an inhibitor noncompetitively to the substrate binding site
   (d) Cooperative binding of substrate to an enzyme with four or more subunits
   (e) Cooperative binding of substrate to an enzyme that does not deviate from normal Michaelis-Menten kinetics
4. Two isozymes
   (a) have the same amino acid sequences but use different coenzymes.
   (b) have slightly different amino acid sequences, but can have radically different enzyme kinetics.
   (c) are different enzymes but have the same affi nities for the samesubstrates.
   (d) are two enzymes coded for by different DNA sequences.

أنظر خلفه

5. An apoenzyme is
   (a) an enzyme that does not require a cofactor.
   (b) an enzyme that requires a bound cofactor.
   (c) an enzyme that requires a cofactor, which is not bound.
   (d) an enzyme that requires an organic cofactor.

6. In competitive inhibition

   (a)an inhibitor competes with the substrate for a binding site on the enzyme.
   (b)an inhibitor can bind to a substrate preventing the enzyme from doing so.
   (c) an inhibitor binds to the enzyme-substrate complex, preventing the reaction from going forward.
   (d)an inhibitor binds to a product molecule after an enzyme mediates reaction,and reverses it.

7. A hydrolase is an enzyme which
   (a) cannot function in the presence of H_2O.
   (b) requires H_2O to induce a change in the spatial arrangement of amolecule.
   (c) releases H_2O after cleaving C—C, C—N, C—O, and other bonds.
   (d) requires H_2O to cleave C—C, C—N, C—O, and other bonds.

8. Restriction endonucleases
   (a) Cut RNA chains at specific locations
   (b) Excise introns from hnRNA
   (c) Remove Okazaki fragments
   (d) Act as defensive enzymes to protect the host bacterial DNA from DNA of foreign organisms

9. Which of the following is not true regarding enzymes?
   (a) They catalyze only a particular type of reaction
   (b) They remain active even after separation from the source
   (c) They are destroyed after the completion of the reaction they catalyse
   (d) They are irreversibly destroyed at high temperature
   (e) Their activity depends on the pH of the solution

10. Serum acid phosphatase level increases in

   (a) Metastatic carcinoma of prostate
   (b) Myocardial infarction
   (c) Acute pancreatitis
   (d) Liver diseases

Good luck

Examiner: Prof Dr: Ibrahim Helmy

٣ كيمياء حيوي . أيض الماء والعناصر كح ٣٧٤

Mansoura university
Faculty of science
Chemistry Department
Subject : Biochem.374
Course : Water & Minerals Metabolism

First Term Exam 2013 / 2014
Third Level Biochem Students
Date : 16 Jan, 2014
Time Allowed : 2 hours
Total Mark : 60 Marks

Answer the following questions
Provide your answer with formula, equations, pathways, figures or tables wherever possible

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Q1: **[25 Marks]**

1. Explain how you can correct calcium level?
2. Discuss the role /function of magnesium with neuromuscular systems?
3. What are the causes of hypo/hypernatremia?
4. Discuss the role of hormonal effect on Ca-Metabolism and homeostasis.
5. Discuss the iron transport, storage and cellular uptake?

Q2: Put(√) for right sentence and put (X) for wrong sentence: **[10 Marks]**

1-The ADH acts on the kidneys to increase renal water reabsorption.
2-During acidosis, leads to decreases the oxygen affinity of Hb in the blood.
3-During acidosis, causes partial lipid breakdown and destructive oxidative cascades, accelerating free radicals damage of the cell walls and intracellular membrane.
4-Acidosis is the first step towards premature aging, interfering with eyesight and memory.
5-Deep breathing decreases H^+ concentration by elimination of acidic CO_2.
6-During shallow breathing, increases H^+ concentration by in the blood because of retention of acidic CO_2.
7-With prolonged acid loads and long standing academia, bone releases calcium carbonate ($CaCO_3$) and calcium phosphate ($CaPO_4$) can contributes and leads to bone demineralization and osteoporosis.

PTO

8-K^+ depletion causes increasing H^+ secretion and hence metabolic acidosis.

9-A normal anion gap with low HCO_3 and high serum Cl^- indicates metabolic acidosis.

10- The delta gap is the difference between the patient anion gap and the normal anion gap.

Q3: Write briefly on the following: **[25 Marks]**

1- Hemoglobin recycling.
2- Lactic acidosis.
3- Transferrin receptor.
4- Sulfur cycle.
5- Rennin-Angiotension-Aldosterone Axis.

Good Luck **Prof. A.F. Abdel-Aziz**

المستوى الثالث كيمياء وكيمياء حيوية ٢٠١٤

Mansoura University Faculty of Science Chemistry Department Code: Chem.341 Subject : Electrochemistry	كلية العلوم جامعة المنصورة	First Term Third Level Program : Biochemistry& Chemistry Date : January 2014 Time Allowed : 2 hours Full Mark : 60 Marks

Answer All Questions الأسئلة على الوجهين

First Question : (20 Mark)

[A] Give reason: (10 Mark)

(i) Glass electrode is the most convenient one for measuring solution pH.

(ii) Saturated KCl is the one preferred in salt bridge.

(iii) Chemical cell with transference are not suitable for exact thermodynamic calculations.

(iv) When oxygen is reduced,the electrode potential is subject to wide variations.

(v) E^{o} for concentration cell is zero.

[B] Write on : Decomposition potential . (10 Mark)

Second Question : (20 Mark)

[A] Complete : (10 Mark)

(i) Maxwell distribution law is given by the expression.....

(ii) When the electrode is polarized , the overpotential η plays two roles:.....and.....

(iii) The overpotential necessary for electrolysis of water is.....

(iv) The transport number of the anion or the cation is.....

(v) In Cd-Weston cell .....is the anode and .....is the cathode

(vi) As an example of amalgam electrode concentration cell .....

(vii) Concentration overpotential is due to .....

[B] Deduce the relation between the electrode potential and ionic concentration. (6 Mark)

[C] Given the cell : Zn / $ZnCl_2$ / AgCl / Ag

(i) Complete : The type of the cell is.....because.....

(ii) Write the electrode and cell reaction. (4 Mark)

Third Question : **(20 mark)**

[A] Write on : **(10 Mark)**

(i) Liquid junction potential

(ii) Work function φ

(iii) Determination of ΔH from emf measurement.

(iv) Gas electrode.

(v) Exchange current i_o.

[B] The following values of emf of the ccll : **(10 Mark)**

$$Ag / AgBr_{(s)} / KBr\ (a=1) / Hg_2Br_2 / Hg$$

at various temperatures is given as follows :

t^oC	20	25	30
E, V	0.06630	0.06839	0.07048

Write the electrode reactions , cell reaction and calculate at 25^o C:

(i) Equilibrium constant K (ii) ΔG (iii) ΔH (iv) ΔS