Past Papers

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DOPAMINE SCIENTIFIC TEAM

MID – Lecture 1 to 3

Metabolism

﴿ وَإِن تَتَوَلَّوْا يَسْتَبْدِلْ قَوْمًا غَيْرَكُمْ ثُمَّ لَا يَكُونُوا أَمْثَالَكُم ﴾

اللهم استعملنا ولا تستبدلنا

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29 Past Qs and then 18 Test Bank Qs

Past Papers are from slide 3 to 31

TEST BANK Qs are from slide 33 to 50

Q1 : If a reaction has negative ΔG then it has to be:

A-Exergonic

B-Exothermic

C-Endothermic

D-Endergonic

E-non of the above

Answer : A

Q2 :Measure the change in the disorder of reactants and products is?

A-Delta G

B-Delta H

C-Delta S

D-Delta T

E-Delta G°

Answer : C

Q3 :Which of the following that predict whether reactions is spontaneous or not:

A-Delta G°

B-Delta G

C-Delta H

D-Delta E

E-Delta E°

Answer : B

Q 4:Delta G represents energy changes at constant temperature, pressure and proton concentration:

A-True

B-False

C-Can't be known

D-Depends on the conditions

Answer : B

Q 5:Delta G=DeltaG° ,when:

A-R=0

B-[reactant]=0

C-[B]/[A]=0

D-In [B]/[A]=1

E-[B]/[A]=1

Answer : E

Q 6:Which of the following pair is NOT true:

A-positive delta G—>endergonic

B-negative delta G—>exergonic

C-Delta G=Zero—>equilibrium and concentration ([A]=[B]) are equal

D-Delta G=don’t measure fast of reaction

E-exergonic reaction is favorable

Answer : C

Q7 :3-Assuming Q is the ratio of product to reactant concentrations; which of the following graph points represents accurately the equilibrium point?

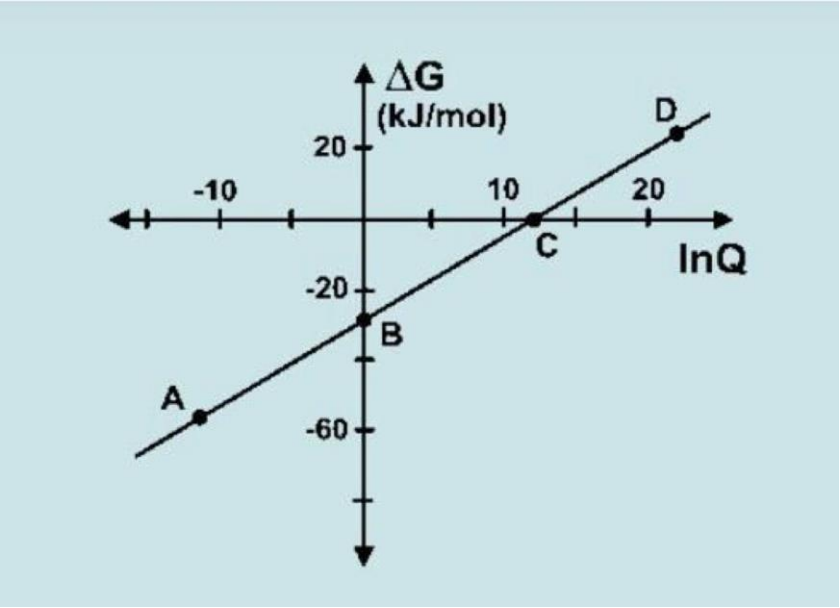
A. Point A

B. Point C

C. Point D

D. Point B

E. Cannot be known from the information given, so can be any of the above points



Answer : b

Q8 :Which one of the following reaction would you expect to be exergonic?

a. Decarboxylation

b. Condensation

c. Transamination

d. Carboxylation

e. Phosphorylation

Answer : a

Q9 :A reaction with(-632) delta g, is it endergonic or exergonic reaction? And how will the addition of an enzyme affect delta g?

A. Endergonic reaction, will not affect delta G

B. Exergonic, will reduce activation energy

C. exergonic reaction, will not affect delta g

D. Endergonic, will increase activation energy

E. Exergonic, will increase activation energy

Answer : C

Q 10:reaction has delt g°>0, what do you expect the value of Keq ?

A. Keq>1

B. keq=0

C. keq<1

D. keq>0

E. keq=1

Answer :C

Q11 :What is the standard free energy of the reaction if delta E°=-10 mvolt, 2 electron transported, Faraday constant=23 Kcal/volt?

A)0.46 kcal

B)-0.46 kcal

C)4.6 kcal

D)-4.6 kcal

E) 0.046 kcal

Answer : A

Q12 :ATP is the energy molecule of the cell because:

A) it is the only energy molecule in the body

B) it has 3 phosphate groups

C) it has an intermediate energy value

D) it isn’t present in all cells

E) C+D

Answer : C

Q 13:In experiment electrons transferred =4 and ΔE°=10 mv calculate ΔG°=?

a) 0.95
b) -0.92
c) 0.92
d) -.092
e) 0.092

Answer : b

Q 14:if you have the following rxns and their delta G values at standard conditions
A + B --> C + Pi.....Δ G0 = -43.0
ATP --> ADP + Pi..... Δ G0 = -30.5 The value of Δ G at standard conditions for the following RXN equals: A + B + ADP ---> C + ATP

a) -73.5

b) +73.5

c) -12.5

d) +12.5

e) we can't find it out unless we have Keq

Answer : c

Q15 :If enthalpy change(ΔH°) for a reaction is zero, then ΔG° equals to :

a) -TΔS°

b) TΔS°

c) -ΔH°

d) lnkeq

e)- lnkeq

Answer : a

Q 16:ΔG° is defined as the :

a) Residual energy present in the reactants at equilibrium

b) Residual energy present in the products at equilibrium

c) Difference in the residual energy of reactants and products at equilibrium

d) Energy required or released to reach equilibrium when[products]= [reactants] =1

e) Residual energy present in the products and reactants

Answer : d

Q 17:For a reaction if ΔG° is positive, then:

a) The products will be favored

b) The reactants will be favored

c) The concentration of the reactants and products will be equal

d) All of the reactant will be converted to products

e) a+d

Answer : b

Q 18:If ΔG° of the reaction A → B is -40kJ/mol under standard conditions then the reaction:

a) Will never reach equilibrium

b) Will not occur spontaneously

c) Will proceed at a rapid rate

d) Will proceed from left to right spontaneously

e) keq <1

Answer : d

Q 19:Which of the following statements is true ?

a) The reaction tends to go in the forward direction if ΔG is large and positive

b) The reaction tends to move in the backward direction if ΔG is large and negative

c) The system is at equilibrium if ΔG = 0

d) The reaction tends to move in the backward direction if ΔGo is large and positive

e)The reaction tends to go in the forward direction if ΔGo is large and negative

Answer : C

Q20 :The standard free energy change for a reaction in which A and B are converted to C and D is 0.4. The reaction was started by mixing 1 mmoles of each reactants and products. When the reaction reaches equilibrium, you expect that the molar concentration of:

a. A is greater than B.

b. A is larger than D.

c. A less or equal to C.

d. A and C are equal.

e. A is larger or equal to D.

Answer : b

Q21 :The hydrolysis reaction of Glucose 6-phosphate is produces 3.3 kcal per mole under standard conditions. Calculate the standard free energy reaction for the synthesis of glucose 6-phosphate from ATP and glucose:

a. -4.0

b. -3.3

c. -10.6

d. 10.6

e. +3.3

Answer : e

Q22 :if a non-spontaneous reaction accompanied by an increase in enthalpy , what do expect delta g:

a. this reaction must be endothermic

b. heat is liberated from reaction

c. the rate of reaction is high

d. I can’t determine delta G

e. this reaction must be exothermic

Answer : A

Q23 :A reaction has a positive delta G note, one statement is correct:

a.This reaction will not happen in a cell.

b. It could happen if coupled with an endergonic reaction.

c. It can happen when changing the concentration of the reactants and the product.

d. lnkeq<1

e. c+d

Answer : D

Q24 :If you know that, delta E for these reactions are NAD+\NADH = -0.32,pyruvate\lactate E= -0.19, choose the correct statement:

a) pyruvate\lactate is the stronger oxidizing agent.
b) NAD+\NADH is the stronger oxidizing agent.
c) Pyruvate\lactate is the stronger reducing agent.
d) NAD+ is higher tendency to gain electrons than pyruvate
e) C+B

Answer : a

Q25 :Which one of the following cannot be a mechanism used in the body to overcome an endergonic reaction?

a. Reaction coupling

b. Increased substrate concentration

c. Low intermediate concentration

d. Decreased product concentration

e. none of the above

Answer : C

Q 26:If you knew that the conversion of oxaloacetate to malate has delta G note of +32 KJ/mol, which of the following is true:

a. it will move slower.

b. it will not happen in the cell.

c. It may occur in the cell with specific concentrations for the reactant and products.

d. It could happen if coupled with an endergonic reaction.

e. None of the above.

Answer : C

Q 27:Which of the following concentrations of ATP and ADP are the most suitable for the human body?

	ATP	ADP	Pi
A	2	14.2	10
B	5	10	25
C	5	0.2	10

a) A

b) B

c) C

Answer : C

Q28 :All of the following regarding thermodynamics are INCORRECT, except:

a. If $\Delta G<0$, reaction is spontaneous and releases energy

b. If $\Delta G< 0$, reaction is spontaneous and consumes energy

c. If $\Delta G>0$, reaction is spontaneous and consumes energy

d. If $\Delta G>0$, reaction is non-spontaneous and releases energy

e. a+b

Answer : A

Q29 :The equilibrium constant (Keq) is independent of which of the following?

a) Concentration of reactants

b) Concentration of products

c) Pressure

d) Temperature

e) Gibbs free energy

Answer : e

Test bank Qs

Test bank Q

Q30 : Which of the following statements regarding equilibrium is false?

A. Reactions with an equilibrium constant > 1 favor products

B. Concentrations of products and reactants is not necessarily equal

C. Ratio of products to reactants is constantly increasing

D. Rate of forward reaction is equal to rate of backward reaction

E.all of the above

Answer : C

Test bank Q

Q31：What happens to ΔG when reactant concentrations increase significantly at equilibrium?

A. It becomes more positive

B. It becomes more negative

C. Stays the same value

D. Nears zero

E. Note enough information provided

Answer : A

Test bank Q

Q32：In what cellular process is CTP primarily involved ?

A. Carbohydrate Synthesis

B. Combining Sugars

C. Protein Synthesis

D. Lipid Synthesis

E. Phosphorylation

Answer : D

Test bank Q

Q33：What happens to the free energy released from ATP hydrolysis in an energy-coupled reaction?

A. Stored in the products of the reaction

B. Converted into entropy

C. Used to drive a spontaneous reaction

D. Drives an endergonic reaction

E. Used to increase cellular temperature

Answer : D

Test bank Q

Q34：Which molecule is most often used alongside ATP to couple energy in protein synthesis?

A.CTP

B.UTP

C.GTP

D.FADH2

E.UMP

Answer : C

Test bank Q

Q35 :How does ΔE∘ relate to the spontaneity of a redox reaction?

A. A positive ΔE∘ means the reaction is spontaneous
B. A negative ΔE∘ means the reaction is spontaneous
C. ΔE∘=0 means reaction is at equilibrium
D. ΔE∘ is not related to the spontaneity of the reaction
E. All are correct

Answer : A

Test bank Q

Q36 : Calculate the ΔG∘ for a reaction where 3 moles of electrons are transferred and the ΔE∘ is -0.2 V (Faraday constant F=23.06 kcal/volt).

A.13.84 kcal/mol

B.27.67 kcal/mol

C.-13.84 kcal/mole

D.-27.67 kcal/mol

E. Can't be determined from information

Answer : A

Test bank Q

Q37：What is a coenzyme A molecule primarily used for?

A. ATP synthesis

B. Acetyl group transfer

C. Protein Synthesis

D. Carbohydrate storage

E. Lipid Synthesis

Answer : B

Test bank Q

Q38：What is the Gibbs free energy change ΔG for ATP hydrolysis in standard conditions?

A.-7.5 kcal/mol

B.-3.4 kcal/mol

C.-7.3 kcal/mol

D.+3.4 kcal/mol

E. 14.6 kcal/mol

Answer : C

Test bank Q

Q39：What does the term “thermogenesis” refer to?

A. Energy production for ATP synthesis

B. Energy expended for heat generation

C. Energy required for muscle contraction

D. Energy lost in metabolic pathways

E. Energy stored in fats

Answer : B

Test bank Q

Q40：When does a reaction reach equilibrium?

A. When reactants are completely consumed

B. When the rate of forward and reverse reactions are equal

C. When the concentration of reactants equals that of products

D. When the reaction is the irreversible

E. Delta G< 0

Answer : B

Test bank Q

Q41: Which of the following statements describes the relationship between ΔG and ΔGº in cellular conditions?

A) ΔG equals ΔGº under all conditions

B) ΔG represents the free energy change under standard conditions, while ΔGº accounts for physiological conditions

C) ΔG is constant regardless of product and reactant concentrations

D) ΔG is related to ΔGº through the equation: $\Delta G - \Delta G^{\circ} = RT \ln K_{eq}$

E) ΔG is always positive for anabolic reactions

Answer : D

Test bank Q

Q42: A reaction has a ΔGº of +3.4 kcal/mol. Which of the following changes could allow this reaction to proceed spontaneously in a cell?

A. Decreasing the concentration of reactants

B. Increasing the concentration of products

C. Coupling the reaction to ATP hydrolysis

D. Lowering the reaction temperature

E. Increasing the reaction activation energy

Answer : C

Test bank Q

Q43: All of the following are characteristics of exergonic reactions except:

A. They have a negative ΔG

B. They release free energy to the system

C. They are spontaneous under standard conditions

D. They require an input of energy to proceed

E. They are often coupled with endergonic reactions in metabolism

Answer : D

Test bank Q

Q44: All of the following are true about thermogenesis except:

A. Thermogenesis refers to the production of heat as a by-product of metabolic reactions.

B. Shivering thermogenesis involves muscle contractions that generate heat

C. Non-shivering thermogenesis is mainly associated with brown adipose tissue

D. Non-shivering thermogenesis is an ATP-consuming process that occurs in response to cold temperatures.

E. Thermogenesis helps maintain body temperature, particularly in cold environments

Answer : A

Test bank Q

Q45: A reaction has a ΔGº of –2.5 kcal/mol, and the ratio of reactants to products 10:1.What happens to the ΔG value of the reaction?

A. ΔG becomes more negative, reaction favors forward direction
B. ΔG becomes more positive, reaction becomes less spontaneous
C. ΔG stays the same as ΔGº
D. ΔG becomes zero , thus reaction reaches equilibrium
E. ΔG becomes more positive, reactions favors backward direction

Answer : E

Test bank Q

Q46: Which of the following statements is true about the relationship between ΔG, ΔGº, and Keq?

A. ΔG = ΔGº when Keq=0

B. When ΔG is negative, reaction is always spontaneous under standard conditions

C. When ΔGº is positive, reaction is always non-spontaneous under standard conditions

D. ΔG depends only on the concentration of reactants

E. ΔG = ΔGº only when the temperature is 25°C

Answer : C

Test bank Q

Q47: All of the following statements is true about ΔG except:

A. ΔG can determine whether reaction is spontaneous or not

B. ΔG is not affected by the reaction mechanism or pathway

C. ΔG can't be altered by enzymes catalyzing the reaction

D. ΔG only depends on the initial and final states of the reaction

E. A reaction with ΔG=1 is at equilibrium

Answer : E

For any feedback, scan the code or click on it.

Corrections from previous versions:

Versions	Question #	Before Correction	After Correction
V1 → V2			
V2 → V3			

اللهم اغفر لنا ذنوبنا وإسرافنا في أمرنا وثبت أقدامنا وانصرنا على القوم الكافرين

لا تنسوا إخوانكم المستضعفين من صالح دعائكم