Mansoura University
Faculty of Science
Chemistry Department
Subject: Analytical Chemistry
Course: Environmental Chemistry
Course code: Chem. 413

4th level (Zoology, Botany, Chemistry and Biochemistry)
Date:16/5/ 2015
Time allowed: 2 hours
Full Mark: 60 Marks

Answer the Following Questions:

Q1) Explain, what do you meant by (choose 5 only): **(15 marks)**

a) **Essential Limit and Toxic Limit for metal ions in water.**
b) **BOD and COD.**
c) **Types of organic pollutants.**
d) **Chemical speciation.**
e) **Heavy metals and trace element.**
f) **Applications of water reuse.**

Q2) Characterize the biochemical effect of each of the following and suggest antidotes for each: **(10 marks)**

a) **Carbon monoxide.**
b) **Cyanide.**

Q3) a) Discuss the mechanism of toxic chemicals on enzymes. (10 marks)
b) Write a note on methyl isocyanate (MIC). **(10 marks)**

Q4) Write short notes on each of the following: **(15 marks)**

a) **Incineration method of waste disposal.**
b) **Sanitary landfill method for waste disposal.**
c) **Main steps for anaerobic treatments for organic waste and biogas generation.**

Best wishes for success,

Prof. Dr. I. Kinawy, Prof. Dr. M. El-Defrawy, Dr. W. Abo El-Maaty and Dr. H. Moustafa

Mansoura University
Faculty of Science
Zoology Department
Subject: Zoology
Course: Cell Biology (Z- 409)

4th level Zoology & Chemistry
Date: 19/5/2015
Time Allowed: 2 hrs
Full Mark: (60 marks)

PART (I) (30 Marks)

1) Q1A-Define the following terms (1 mark each)

1-Golgian zone of exclusion

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2-Residual bodies

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3-Orthodox conformation

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4- Glycosylation

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5-F1 particles

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Q1B-Mark True (√) or False (×) (1 mark each)

1) Smooth ER plays a role in the secretion of chloride ions in the hydrochloric acid-secreting cells of the stomach lining ( )

2) The ribosomes occur in all prokaryotic and eukaryotic cells. ( )

3) The Golgi complex controls the modification of membranes from endoplasmic reticulum-like to plasma membrane-like. ( )

4) The ribosomes form a built-in mechanism of the cell ( )

5) Thermogenesis is one of Golgi complex functions. ( )

6) Peroxisomes are oxidative organelles of cells which use molecular oxygen, but produce no ATP molecule for the cell. ( )

7) Red blood cells (erythrocytes) of mammals and other higher animals contain neither mitochondria nor endoplasmic reticulum. ( )

8) Intestinal absorptive cells have abundant smooth ER ( )

9) The nuclear DNA contains more guanine and cytosine (GC) contents than the mitochondrial DNA ( )

10) The conversions of cholesterol to steroid hormones in the adrenal cortex are catalyzed by lysosomalenzymes. ( )

Q2 A- Discuss the special properties of lysosomal membrane (5 marks)

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Q2B-Choose the correct answer (1 mark each)

1) In the pigmented retinal cells,..... exists in the form of tightly-packed vesicles and tubes known as myeloid bodies.

a- SER b- Ribosomes c- Perixsomes

2) The region of the matrix containing ..... takes basophilic stain and is named as ergastoplasm, basophilic (alkaline staining) bodies

a- Ribosomes b-RER c-Lysosomes

3) ..... transmits impulses from the surface membrane into the deep region of the muscle fibers.

a-SER b- elementary particles c- Sarcoplasmic reticulum

4) The ..... ribosomes occur in the prokaryotic cells of the blue-green algae and bacteria.

a-70S b-77S c- 80S

5) In ..... secretion, the secretion vesicle buds through the plasma membrane carrying with it a portion of that membrane and hence a thin layer of cytoplasm.

a-Apocrine b-Merocrine c-Holocrine

6) ..... occurs mostly in cells have no active participation in the synthesis of proteins.

a- SER b- RER c- Golgi comple

7) Casein is ordinarily secreted by..... Mechanism

a-Apocrine b-Merocrine c-Holocrine

8) Sebaceous gland is an example of .....

a- Apocrine b-Merocrine c-Holocrine

9) ..... plays a role in secretion of steroid hormones by mammalian gonads

a-SER b- Golgi complex c- a and b

10) ..... are supposed to initiate the mitosis in cells.

a- Lysosomes b-ribosomes c- centriole

PART (II) (30 marks)

I) write (√) or (×): (15 marks, 1 mark each)

1) Integral membrane protein is the main participant in forming ligand ion channels ( )

2) Glucose is more permeable through cell membrane than Urea do ( )

3) Osmosis is the diffusion of water through cell membrane from high electrolyte concentration to low electrolyte concentration ( )

4) Chloride anion is an intercellular abundant electrolyte ( )

5) Voltage gated ion channel is implicated in nerve impulse propagation by allowing K^+ Influx ( )

6) Uniport transport is an example of ion coupled channel transport ( )

7) Binding of cytoplasmic Na^+ is essential for Na^+/K^+ pump phosphorylation ( )

8) Sliding of secretory vesicles on microtubules cytoskeleton is the main transport system in cytoplasm ( )

9) Integrins are the main cell receptor of extracellular matrix fibers ( )

10) Intermediate filaments are the most permanent cytoskeleton in supporting cell shape and organelles ( )

11) Claudins are the main intercellular connecting protein in tight junctions ( )

12) The cell-ECM desmosomal junctions are the connecting sites of intracellular intermediate filaments ( )

13) NO causes smoth muscles relaxation by binding to enzyme guanylyl cyclase ( )

14) Alteration of hemidesmosomal functions are leading to a failure of wound repair ( )

15) Acetylcholine causes heart muscles contraction ( )

II) Choose the Right answer (15 marks, 1 mark each)

1) Which one of the follows is <u>not</u> considered as protein post-translation modification

a) Glycosylation b) Phosphorylation c) Ubiquitination

2) Which of the follows is truly representing the ions and molecules permeability via Cell membrane

a) Cl^- >Glucose> Na^+ b) Glucose> Cl^- >Na^+ c) Na^+>Cl^- >Glucose

3) Desmosomes are the attachment sites for .....

a) Actin microfilaments b) Intermediate filaments c) Spindle fibers

4) The transmembrane adhesion proteins of Cadherin family is present at .....

a) Tight junctions b) Adheren junctions c) Gap junctions

5) The cell adhesion protein involved in blood cell transmigration is ……..

a) Selectin b) Cadherin c) integrin

6) ……..… is Ca^{++} dependant cell adhesion molecule

a) Cadherin b) integrin c) Ig-like CAM

7) The transmembrane adhesion proteins of Cadherin family is present at

a) Tight junctions b) Adheren junctions c) Gap junctions

8) The type of cell communication that can control distant cell functions is ……. signaling

a) Paracrine b) synaptic c) endocrine

9) The mode of action of Viagra is conducted by increasing the half life time of …….

a) cGMP b) cAMP c) phosphodiesterase

10) The process of protein marking for degradation using three set of enzymes is called ……..……. degradation pathway

a) necrotic b) lysosomal c) proteosomal

11) ……..……are the building units of centrioles

a) Microtubules b) Microfilaments c) Intermediate filaments

12) The cell organelle responsible for hydrogen peroxide generation and degradation are …….

a) lysosomes b) peroxisomes c) golgi bodies

13) Signaling though gap junctions is an example of …… signaling.

a) Synaptic b) Paracrine c) contact-dependant

14) ……..… is essential for endothelial cell survival.

a) E-cadherin b) N-cadherin c) VE-cadherin

15) Swelling of RBCs is an example of placing RBCs in …….. solution.

a) Hypotonic b) Hypertonic c) Isotonic

Best Wishes

Prof. Sherif Abdeen

Dr. Mohamed E. Abdraboh

Dr. Doaa A Ali

Dr. El Sayed Kamel

Mansoura University
Faculty of Science
Zoology Department
Courses: Immunology & Molecular Biology
Academic Year: 2014-2015

Second Term - Final Exam
4th Level Students
Date: 23 May, 2015
Time Allowed: 2 hrs
Full Mark: 60

Answer All Questions

Part I Immunology

Question 1 **(15 marks)**

Write short notes on (Draw when needed):

a) Development of T and B cells.

b) IgG.

Question 2 **(15 marks)**

A- Complete:

a) Skin, mucous membranes and cilia are among the components of ..... immunity.

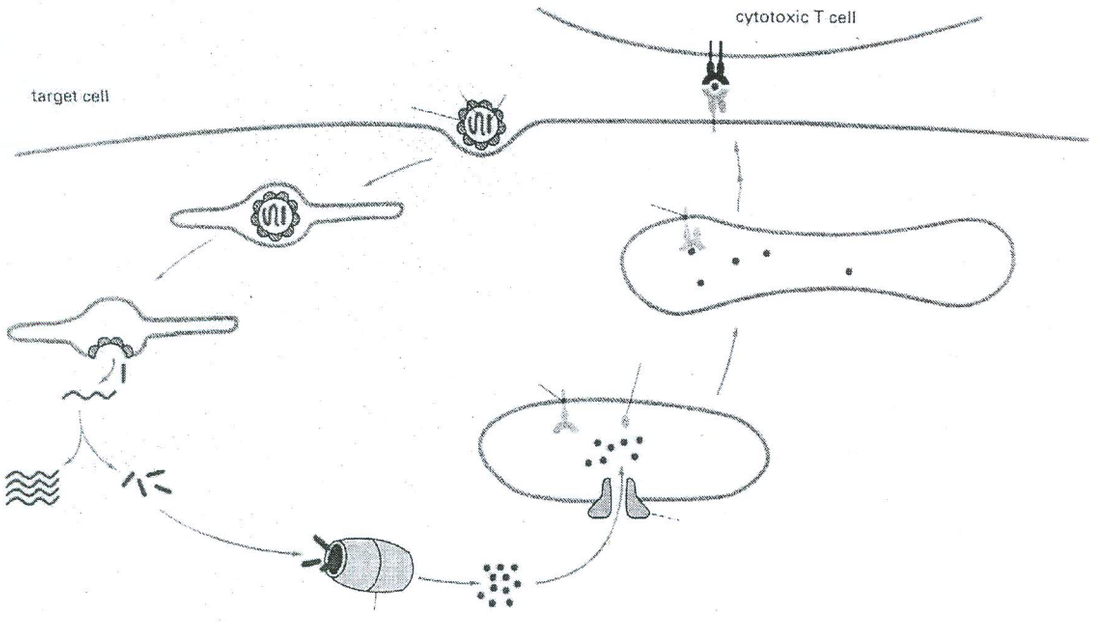
b) ..... cells develop in the thymus and function in the ..... lymphoid organs .

c) Mothers' milk has ..... and ..... classes of antibodies.

d) Membrane-attack complement components include ..... , ... , ... , ... , ...

e) Cytotoxic T cell has ..... co-receptor.

B- Identify, draw and put the labels for the following diagram:



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Part II: Molecular Biology

Q. 3: Write on the Following Statements: **(20 marks, 5 Marks each)**

A: *Applications of recombinant DNA technology.*

B: *Type II Restriction endonucleases enzymes.*

C: *Characteristics of cloning vectors.*

D: *How are plasmids transferred into bacterial cells?*

Q. 4: Write short notes on the Following items: **(10 marks, 5 Marks each)**

A: *Difference between Polyacrylamide and agarose Gel.*

B: *The main steps of Polymerase Chain Reaction (PCR).*

With our best withes

Prof. Dr. Shrif Abdeen

Dr: Sayed Kamel Areida

Mansoura University
Faculty of Science
Chemistry Department
Subject: Inorganic Chemistry
Code: (Chem 425)

Final Exam
Fourth year of Botany & Zoology
Date: 26/5/2015
Time Allowed: 2 hrs.
Marks: 80

Answer the following questions

[1] Write *short notes on the following:* *(7 Marks)*

a) Lanthanide contraction.

b) One application of Lanthanide **or** Actinide elements.

[2] Complete the following: *(12 Marks)*

1) Monazite sand which is the source of lanthanides contains.....,.....,.....

2) The oxidation states of the actinides vary between ..., ..., ..., ... and .....

3) Lanthanide elements are sometimes used as biological ..... for drugs in ..... and animals.

4) Magnetic properties of La^{3+} and Ce^{4+} have no ..... electrons, and are .....

5) The elements Pa, U, Np, Pu and Cm have very ..... lines in their absorption spectra.

6) The actinides all have an oxidation state of (.....), like the .....

7) The white color of Th(IV) compounds is associated with the absence of .....or ..... electrons.

8) ThI_2 is probably ....., $2I^-$ and $2e^-$ in a conduction band.

9) Protactinium (Pa) found in ..... and ores form Zaire.

10) At higher pH values, ... ion hydrolyses and polymerizes via hydroxyl bridges.

11) ..... rods are used to make sure that the reaction does not get out of control.

12) The rare earth complexes with neutral organophosphorus extractants have synthesized $[Nd(NCS)_3(Ph_3PO)_4]$ complex with the coordination number .....

[3] Complete the following equations: *(9 Marks)*

1) $2Ln + 6H_2O \rightarrow$ ..... + ...

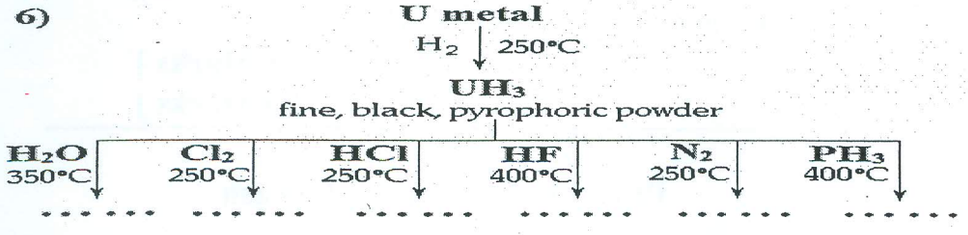
2) $LnCl_3.6H_2O \xrightarrow{heat}$ ..... + ... + ...

3) $Ce_2(C_2O_4)_3 + 2O_2 \rightarrow$ ..... + ...

4) $Th(NO_3)_4.5H2O + NaOH \rightarrow$ ..... + ...

5) $^{232}_{90}Th \xrightarrow{n\,\gamma} ^{233}_{90}\text{.....} \xrightarrow[22\ min]{\beta} ^{233}_{91}\text{.....}$

6)



[4] Choose the correct answer to each of the following questions: *(12 marks)*

1) What type of elements are the lanthanides and actinides?

a) mostly metals and a few nonmetals. b) mostly nonmetals and a few metals.

c) all metals. d) all nonmetals.

2) NdI_2 resembles LaI_2 as

a) both of them is covalent. b) both of them is ionic, contain Ln^{3+}, $2I^-$+ė.

c) both of them is non-stiochiometric. d) ii & iii

Please turn over

3) Lanthanoids are
a) 14 elements in the sixth period (atomic no. = 58 to 71) that are filling 4f sublevel.
b) 14 elements in the sixth period (atomic no. = 90 to 103) that are filling 4f sublevel.
c) 14 elements in the seventh period (atomic no. = 58 to 71) that are filling 4f sublevel.
d) 14 elements in the seventh period (atomic no. = 90 to 103) that are filling 4f sublevel.**4)**

4) The 14 lanthanide elements are energetically favorable to move the single 5*d* electron into the 4*f* level in most of the elements, but not in the cases of
a) La, Gd and Lu. b) Pr, Gd and Lu. c) Nd, Gd and Lu. d) Ce, Gd and Lu.

5) Which of the following lanthanoid ions is diamagnetic? (At. nos. Ce = 58, Sm = 62, Eu = 63, Yb = 70)
a) Ce^{2+} b) Sm^{2+} c) Eu^{2+} d) Yb^{2+}

6) The actinoids exhibits more number of oxidation states in general than the lanthanoids. This is because
a) the 5f orbitals are more buried than the 4f orbitals. b) the actinoids are more reactive than the lanthanoids.
c) there is a similarity between 4f and 5f orbitals in their angular part of the wave function.
d) the 5f orbitals extend further from the nucleus than the 4f orbitals.

Section (B)

1. Apply the VBT and CFT on the complex $[Mn(H_2O)_6]Cl_2$. Determine the number of unpaired electrons, degree of distortion and the CFSE (Δ_o=7800Cm^{-1}) [Mn Z=25]
[10 Marks]

2. Which complex of the following pairs has the larger value of Δ_o and explain the reason :
[8 Mars]

i) $[Co(H_2O)_6]^{3+}$ and $[Rh(H_2O)_6]^{3+}$
ii) $[Co(H_2O)_6]^{2+}$ and $[Co\ (H_2O)_6]^{3+}$
iii) $[Co\ Cl_6]^{4-}$ and $[Co\ Cl_4]^{2-}$
iv) $[Co(NH_3)_6]^{3+}$ and $[Co\ F_6]^{3-}$

3. Comment on the following : **[12 Marks]**
i) The $[Ni\ (CN)_4]^{2-}$ is diamagnetic while $[NiCl_4]^{2-}$ is paramagnetic according to VBT. [Ni=28]
ii) Cobalt (III) ion (3d6) is more stable in ammonia solution than in aqueous solution
iii) The geometry of complexes depends on the coordination **no** (4,5 and 6)
iv) Solid CrF_3 contains Cr(III) in an octahedral, all Cr-F distances are the same. However in MnF_3 the Mn-F distances are not equals. (Cr Z=24, Mn=25)

4. **a)** Calculate the CFSE in $KJmol^{-1}$ of both $[Fe(NH_3)_6]^{3-}$, Δ_o = 20000 Cm^{-1} and $(CoCl_4)^{2-}$, Δo=21000 Cm^{-1}. Assume P=14000 Cm^{-1} and that 1 KJ mol^{-1} =83 Cm-1. (Fe=26,Co=27) **[5 Marks]**
b) Write briefly on limitations of – VBT **[5 Marks]**

Prof. Dr. Nagwa Nawar **Prof. Dr. G.M. Abu El-Reash**

Mansoura University **Faculty of Science** **Chemistry Department** **Subject : Chemistry** **Course(s) : Carbohydrates** **Code : Org. Chem. (434)**		**Second Term** **4th Level Students** **Date : 30 /05/2015** **Time Allowed : 2 hours** **Full Marks : 80 Marks**

Answer All The Following Questions

Question 1 [25 Marks]

A- Draw the Haworth projections for the following sugars. [10 Marks]

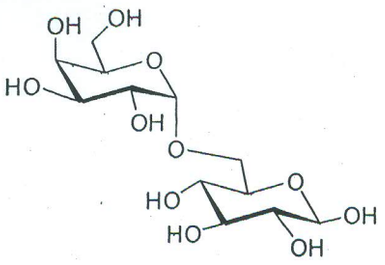
i) D-Glucuronic acid
ii) Methyl-β-D-allopyranoside
iii) Lactose
iv) Raffinose
v) 3-Deoxy-D-idose

B- How can you synthesize L-ascorbic acid from D- glucose ?[6 Marks]

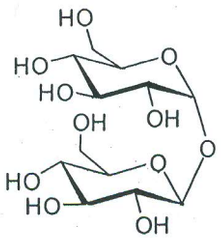
C- Using Ruff method , how can you convert D-talose to D-lyxose ? [5Marks]

D- Comment : Reduction of D-galactose leads to optically inactive alditol. [4Marks]

Question2 [23 Marks]



(1)



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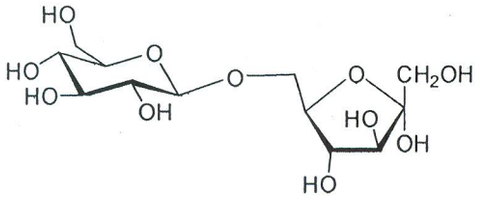

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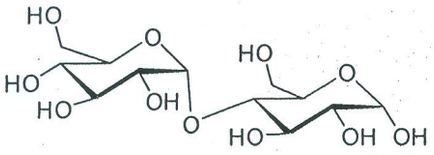
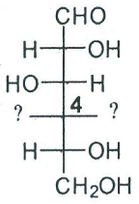


(4)



(5)

A- Describe the glycosidic bond in the disaccharides **(1) ,(2) & (3).** [6 Marks]

B- Classify sugars **(1) ,(2) & (3)** as reducing or nonreducing sugars . Do they undergo mutarotation ? [6 Marks]

C- The disaccharide maltose found in malt has structure **(4)**. Show how can you elucidate the point of attachment in this sugar. [6 Marks]

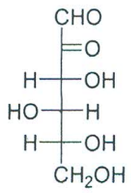
D- Structure **(5)** represents partial structure of D-Glucose. Show how can you elucidate the stereochemistry at carbon atom number **4** . [5 Marks]

Question 3 [32 Marks]

A- Complete the following equations [21 Marks]

(i) D-altrose $\xrightarrow{3PhNHNH_2}$ ---------- $\xrightarrow[\Delta]{CuSO_4}$ ----------

D-altrose $\xrightarrow{3PhNHNH_2}$ ---------- $\xrightarrow{PhN=NCl}$ ----------

(ii) 

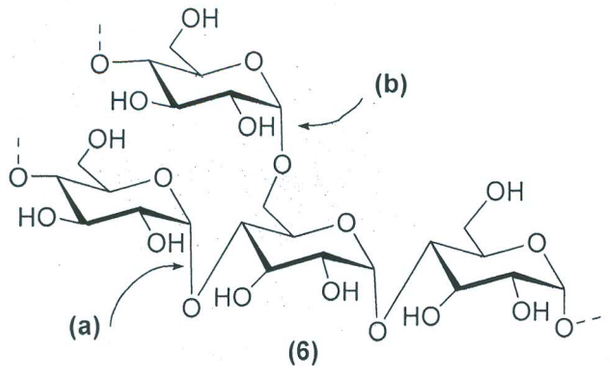
$\xrightarrow{Zn / HCl}$ ---------- $\xrightarrow{OH^-}$ ----------

(iii) α-D- galactopyranose $\xrightarrow{CH_3OH / HCl}$ ----------

α-D- galactopyranose $\xrightarrow{Acetone / HCl}$ ----------

(iv) ---------- $\xleftarrow{HNO_3}$ D-mannose $\xrightarrow[2) \text{ pyridine }, \Delta]{1) Br_2 / H_2O}$ ----------

B- Structure **(6)** represents partial structure of starch . Describe the glycosidic bonds **(a)** & **(b)** .Name the monosaccharide unit. [5 Marks]



C- Prove the ring size in D-Glucose using Jackson & Hudson (periodic acid oxidation). [6 Marks]

----------*With our best wishes*----------

Examiners

A.Prof.Eman Keshk *Dr.Soha M.Abdelmageed* *Dr.Eman Helmy*

Mansoura University
Faculty of Science
Zoology Department
Subject: Zoology (Z 406)
Courses' Physiology(2)

Second Term
4th Level: Chem.&Zool.
Date: 2-6-2014 الثلاثاء
Time Allowed: 2hr
Full Mark: (60)

Answer all Questions: Each Question [20] Mark

First Question: Answer five only of the following: (20 marks)

1- Blood supply of the kidney
2- Steps of secretion of H ions and NH3 from the kidney tubule.
3- Opposite groups of muscle.
4- Compare between slow and fast muscle.
5- Mechanism of Na-K pump.
6- Diffusion of Na, K and Cl ions through nerve cell membrane.

Second Question:A- Answer as shown between brackets: (10 marks)

1- Juxtaglomerular apparatus secrete ---------- and ---------- (complete)
2- Abnormal urine with RBCs (Give scientific name)
3- High threshold substance (Identify and give example)
4- Loop of Henel (draw, illustrate which part is permeable to water)
5- Types of troponin (Illustrate one, Function of the other)
6- Functions of transverse tubule (Give two only)
7- Cross bridge is present all over the sarcomere (Correct if false)
8- Myelinated nerve fiber faster in nerve impulse transmission than non-myelinated nerve fiber (Correct if false, why)
9- Resting membrane potential (70 mv, - 35 mv, - 70 mv) (Choose the correct answer)
10 - Effectiveness of stimulus to skeletal and cardiac muscle (Draw)

B- Answer 5 items only with: a. Increase b. Decrease.
Give one reason for your answer: (10 marks)

1- An increase in plasma levels of erythropoietin will cause blood viscosity to: ----------
2- Aplastic anemia would cause the body's WBC count to: ----------
3- During an acute bacterial infection, blood neutrophil count will: ----------
4- During the vascular spasm phase of hemostasis, the diameter of the affected blood vessel will: ------
5- If the liver was unable to produce normal quantities of plasma proteins, plasma osmotic pressure would: ----------
6- In polycythemia and in heavy smokers,The ESR is: ----------

Third Question: A- Choose the correct answer: (14 marks)

1- Which of the following contains granules filled with histamine and heparin?
a- Erythrocyte b- Basophil c- Eosinophil d- Thrombocyte

2- Bilirubin is formed from ----------
a- Heme b- Globin c- Transferrin d- Factor X
3- The process by which white blood cells exit blood vessels is known as ----------
a- Diapedesis b- chemotaxis c- Exocytosis c- Hemolysis

4- Put the following steps of coagulation in the correct order.

1. Prothrombin activator is formed
2. Subendothelial collagen is exposed
3. Thrombin is formed from prothrombin
4. Fibrinogen is converted to fibrin

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

5- Which of the following anemias are genetic disorders?

a- Pernicious b- Hemorrhagic c- Thalassemia d- Aplastic anemia

6- Place the following events that occur after Red Blood Cell Death in the correct order

A. Iron transported as transferrin
B. Destruction of RBC by phagocytes
C. Iron is stored as ferritin
D. Proteins broken down into amino acids

a- A, B, C, D b- A, C, B, D c- B, D, A, C d- D, C, B, A

7- Place the steps of Red Blood Cell development in order from the Hemocytoblast to the mature red blood cell.

A. Late Erythroblast
B. Reticulocyte
C. Proerythroblast
D. Normoblast
E. Early erythroblast

a- A-C-E-B-D b- B-D-A-C-E c- C-E-A-D-B d- E-D-C-B-A

8- Which is not one of the three steps of hemostasis?

a- Coagulation b- Hemophilia c- Platelet plug formation d- Vasoconstriction

9- Which Blood cell develops into a plasma cell and produces antibodies?

a- Red blood cell b- Monocytes c- Neutrophils d- Lymphocyte

10- The following results were obtained on a blood sample:

- RBC count = $3.72 \times 10^6 /mm^3$ - Hemoglobin content = 12 g/dl - Hematocrit% = 36

What would the RBC indices be? Explain your answer. (2marks)

a- MCV = 96, MCH = 29, MCHC = 32.0 b- MCV = 97, MCH = 32, MCHC = 33.3

c- MCV = 103, MCH = 31, MCHC = 30.0 d- MCV = 105, MCH = 28, MCHC = 31.0

11- How would you expect the RBC in question 10?

a) normocytic, normochromic b) macrocytic, normochromic

c) normocytic, hypochromic d) macrocytic, hypochromic

12- Using the dye method, if you know that :

i- hematocrit value = 40% ii- amount of dye injected = 60 mg
iii- concentration of the dye in the plasma = 0.02 mg/ml
The blood volume = --------- liter, Explain why? (2 marks)

a- 10 b- 5 c- 6 d-3

12- Which of the following is an anticoagulant?

a- platelet factor 3 b- Heparin c- Fibrinogen d- Prothrombin

B- Define FOUR only of the following: (6 marks)

1- Hemopoiesis 2- A/ G ratio 3- Leucocytosis
4- Methemoglobin 5- leucopenia 6- Megakaryocytes

Best Wishes

Prof. Dr. Gamal Edrees Prof. Dr. Elsayed El-Habiby