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	Tanta UNIVERSITY			
	FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY			
	EXAMINATION for senior (fourth Year) students OF BIOCHEMISTRY			
COURSE TITLE:	<i>Ezymology [2]</i>		COURSE CODE <u>4113</u>	
DATE: 14-1	JANUARY 2018	TERM: FIRST	TOTAL ASSESSMENT MARKS: 50	TIME ALLOWED: 2 HOURS

1- A) Describe the complete mechanism for the reaction that results in the Lactate dehydrogenase catalyzed (The active site of the enzyme include histidine 195, Arginin171).

b- Define the following:

- i Specific activity
- ii Non productive binding model
- iii Proximity
- iv Biosensors

c- The role of zinc in carboxy peptidase A

d- How to identify the 2 imidazole of histidine active site (12, 119) of ribonuclease enzymes. (20 marks)

2- Write an account on each of the following :

- a) Properties allosteric enzyme
- b) Properties of support materials in immobilized enzyme
- c) Substrate Specificity of acetylecholine esterase reflect the active site
- d) Comment why hexokinase cannot phosphorylated glycerol or simple alcohol.
(Glucose + ATP Hexokinase ADP + glucose 6 phosphate)
(15 marks)


3- Cell-free extract of E. coli contains 2.4 mg protein per milliliter. Fifty milliliter of the extract was fractionated by 50 % saturated ammonium sulfate precipitation. The fraction precipitated was dissolved in a total volume 8 ml and dialyzed. The solution after dialysis occupied 10 ml and contained 3 mg protein/ml. 0.02 ml of the extract and purified catalyze the phosphorylase enzyme at reaction rate of 5 and 12 $\mu\text{mole/ml/min}$ in a total volume of reaction one ml under the standard assay conditions. The dialyzed fraction was applied to Sephadex G-200. A pure phosphorylase enzyme has specific activity 900 $\mu\text{mol/min/mg}$ protein with total 4 mg protein calculate:

- a- Recovery of enzyme % after dialysis and gel filtration.
- b- The degree of purification after dialysis and gel filtration.
- c- What the different between homotrophic and heterotrophic allosteric enzymes
(15 Marks)

GOOD LUCK

Prof. Tarek M Mohamed

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	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY			
	EXAMINATION FOR LEVEL FOUR STUDENTS (SEMESTER I) OF CHEMISTRY/BIOCHEMISTRY			
	COURSE TITLE:	CLINICAL BIOCHEMISTRY		COURSE CODE: BC4105
	DATE: 06/01/2018	TERM: FIRST	TOTAL ASSESSMENT MARKS: 50	TIME ALLOWED: 2 HOUR

I. Answer the following questions: 20 marks

1. What is the principle of hippuric acid test? Why it is used as LFT?
2. In a patient serum creatinine has been found to be higher than normal but blood urea is within the normal range, what is the likely possibility?
3. What is the difference between creatine and creatinine?
4. In a patient with normal serum creatinine level, blood urea has found to be much higher than normal, what could be the possibility?
5. Compare between the electrograms of serum proteins in chronic hepatitis and in Multiple myeloma.

II. Write short notes on each of the following: 12 marks

1. Newer atherosclerosis risk factors.
2. Serum markers of myocardial infarction (MI).
3. Non-respiratory functions of the lung.

III. Complete each of the following: 6 marks

1. The plasma concentration at which a particular substance begins to appear in the urine is the-----
2. -----, ----- and ----- are three forms of coronary artery disease (CAD).
3. ----- is an important biomarker with an established role in the diagnosis of congestive heart failure (CHF).

IV. Choose the correct answer 12 marks

1. An 8-year-old boy was brought to the dermatologist as he had developed vesicles and bullae on his face and arms that appeared after a week-long football practice in sun. His father has a similar condition. A diagnosis of porphyria cutanea tarda was confirmed by finding elevated levels of porphyrins in his serum. His disease is due to a deficiency of which of the following enzymes?

a. ALA dehydratase	b. Ferrochelataase
c. Uroporphyrinogen decarboxylase	d. PBG deaminase

2. A patient presents with dull right sided abdominal pain, fever from 7 days, loss of appetite, pale stool and jaundice. Blood biochemistry reveals, mixed hyperbilirubinemia, high SGPT but near normal alkaline phosphatase levels. What is the cause of jaundice?

- a. Viral hepatitis
- b. Post hepatic jaundice
- c. Hemolytic jaundice
- d. None of the above

3. Which serum enzyme elevation is most diagnostic in obstructive jaundice?

- a. ALT
- b. AST
- c. LDH
- d. ALP

4. Urine analysis of a patient reveals the presence of bilirubin and urobilinogen, which serum enzyme is expected to be elevated much higher than normal?

- a. ALT
- b. AST
- c. 5'nucleotidase
- d. ALP


Good Luck

EXAMINERS	PROF. DR. MOHAMMED HUSSEIN
	DR. THORIA A. AZIZ

TANTA UNIVERSITY
FACULTY OF SCIENCE

DEPARTMENT CHEMISTRY – BIOCHEMISTRY SECTION

EXAMINATION for level 4 Semester 2 (4th Year) Biochemistry students 4115

	COURSE TITLE: Drug metabolism	COURSE CODE: BC 4254
DATE: 1/1/2018	TERM: FIRST	TOTAL ASSESSMENT MARKS: 50
		TIME ALLOWED: 2 HOURS

ANSWER ALL THE FOLLOWING QUESTIONS

I- Compare between each of the following: (15 Marks- 3 for each)

- a) Glucuronidation and sulfation conjugation in drug metabolism.
- b) Bioavailability and solubility of drugs.
- c) Reduction and hydrolysis reaction in drug metabolism.
- d) Classification of drugs according to chemical structure and pharmacological action.
- e) Bipartite and tripartite carrier prodrugs.

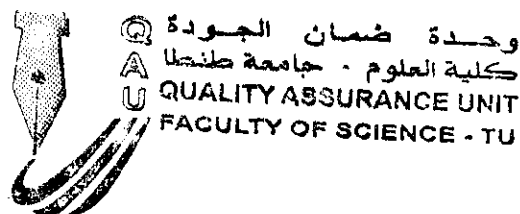
II- Clarify each of the following: (24 Marks - 4 for each)

1. Factors affecting metabolism.
2. Lead discovery approach.
3. Bodor theory of prodrug site specificity.
4. The mechanism of Cytochrome P450 in drug metabolism.
5. Glutathione conjugation in drug metabolism.
6. Advantage and disadvantage of plant source of drugs.

III- Define each of the following: (11 Marks)

- 1- Slow release mechanism for the prodrug.
- 2- Pharmacokinetic and pharmacodynamic.
- 3- Bioprecursor prodrugs.
- 4- Rule of Lipinski.
- 5- Shelf life stability of drugs.
- 6- Sites of Drug Metabolism.

Examiners	Prof. Dr/ Tarek Mostafa Dr/ Abeer khamis
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TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF CHEMISTRY

EXAMINATION FOR SENIOR (FOURTH YEAR) STUDENTS OF BIOCHEMISTRY

COURSE TITLE:	GENETIC ENGINEERING		COURSE CODE: BC 4103
DATE:	30.12.2017	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100
			TIME ALLOWED: 2 HOURS

Answer the following questions

- I. a. **Write the scientific term corresponding to each of the following:** (20 marks)
1. The description of cleavage sites of restriction enzymes within a piece of DNA.
 2. A cloning vector produced by inserting the *cos* sequence from λ -phage DNA into a small *E. coli* plasmid vector about 5 kb long.
 3. *E. coli* cells that have been treated with a buffer that contains CaCl_2 to transform efficiently.
 4. A technique in which short high electric field pulses are applied to cells in order to increase the permeability of their cell membrane allowing foreign DNA to be introduced into the cells.
 5. The number of transformants per total colony forming units (CFU).
 6. The process of inserting genetic material, such as DNA and double stranded RNA (in case of RNA interference), into mammalian cells.
 7. Self-complementary oligomers, having blunt ends on both sides, and contain a recognition sequence for a particular restriction enzyme that are used to clone cDNA in a plasmid.
 8. An enzyme used to remove the 5'-terminal phosphate group of a linearized plasmid thus prohibiting its recircularization.
 9. An approach used to engineer proteins depending on some detailed information about the protein being available.
 10. A technique in which a library of variants of a peptide or protein are expressed on the outside of phage virions, while the genetic material encoding each variant resides on the inside of the corresponding virion.
- b. A researcher has discovered a novel **eukaryotic organism** that glows in the dark. You believe this trait is due to a single gene, and you wish to clone the gene.
1. **Outline** the most likely successful strategy you should follow to clone such a gene and isolate it. (12 marks)
 2. **How** can you identify the protein product of the isolated cloned gene? (8 marks)
- II. a. **Briefly explain:** (28 marks)
1. How an antibiotic-resistance gene and the *lacZ* gene can be used as markers to determine which cells contain a particular plasmid?
 2. How is the homopolymer tailing technique used to clone cDNA in plasmids?
 3. PCR-mediated cloning.
 4. How can ribosomes covalently fuse engineered protein libraries to their own mRNAs in an attempt to select the protein with improved binding affinity?

- b. You are given a plasmid. In order to map this plasmid you set up a series of restriction digests and obtain the following results using agarose gel electrophoresis:

<i>Lane</i>	<i>Digest</i>	<i>Size of fragments in bp</i>
1	BamHI and SmaI	4200, 800
2	SmaI and KpnI	3200, 1500, 300
3	KpnI and BglII	2500, 1500, 1000
4	BamHI and KpnI	3500, 1000, 500
5	KpnI	3500, 1500
6	BglII and BamHI	3500, 1500

1. What is the approximate size of the plasmid? (3 marks)
2. Add the SmaI, KpnI, BglII sites to plasmid map. On your map give the distances between each of the restriction sites. (9 marks)

III. Choose the correct answer: (20 marks)


1. Which of the following is NOT a step taken to produce recombinant DNA using human DNA?
 - a. Cut both human and plasmid DNA with the same restriction enzymes
 - b. Use retroviruses to circularize DNA
 - c. Isolate and purify DNA from tissues and from plasmids
 - d. Seal human DNA fragments into plasmids with DNA ligase
2. Which of the following is NOT correct regarding Type II restriction enzymes?
 - a. They can create blunt ends.
 - b. They make double-stranded cuts in DNA.
 - c. They recognize specific sequences and make cuts further away from the recognition sequence.
 - d. They are named based on their bacterial origin.
3. Plasmids which exhibit DNA replication that is independent of host cell chromosomal DNA replication are known as _____.
 - a. Stringent plasmids
 - b. Relaxed plasmids
 - c. Cryptic plasmids
 - d. a, b, and c
4. Plasmid DNA can be directly delivered into the cytoplasm of mammalian cells using
 - a. Electroporation
 - b. Microinjection
 - c. Biolistic particle delivery
 - d. a, b, and c
5. Some bacteria have developed a remarkable resistance to antibiotics, thus making them especially harmful microorganisms. What feature of such bacteria gives them the property of antibiotic resistance?
 - a. They contain a plasmid with genes for antibiotic resistance.
 - b. They have a thick cell wall protecting them from the immune system.
 - c. They harbor viruses that can attack antibiotic drugs used against bacteria.
 - d. a, b, and c.

6. In genetic engineering, *in vitro* packaging is used to _____.
a. Ensure that genetically engineered bacteria are not accidentally released into the environment.
b. Incorporate recombinant DNA into infectious bacteriophage particles.
c. Place an antibiotic resistance gene in a plasmid.
d. Splice a desired gene into a plasmid.
7. Transformation can occur when _____.
a. Every time two hybrids are bred.
b. A recombinant plasmid gets inside a bacterial cell.
c. Cloning occurs.
d. Radiation fries DNA inside bacteria.
8. A scientist has a processed mRNA transcript for a gene she wants to clone into a bacterial vector. What must she do as a first step in this process?
a. Use PCR to create a cDNA molecule.
b. Sequence the mRNA transcript.
c. Digest the mRNA and cloning vector with the same restriction endonuclease.
d. Ligate the mRNA into the cloning vector.
9. Which of the following does not apply to the construction or use of a DNA library?
a. Determining the location of a particular DNA sequence in a DNA library requires a suitable hybridization probe.
b. Genomic libraries are better for expressing gene products than cDNA libraries.
c. Many segments of DNA from a cellular genome are cloned.
d. The DNA copies of mRNA found in a cDNA library are made by reverse transcriptase.
10. In directed evolution (DE) approach, genetic diversity is created at the genetic level by randomly introducing mutations via
a. Ultraviolet irradiation
b. DNA shuffling
c. Error prone PCR
d. a, b, and c

GOOD LUCK

EXAMINERS	PROF. DR. TAREK M. MOUSTAFA DR. RASHA H. ABU-KHUDIR
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لصاحب الاله

	TANTA UNIVERSITY FACULTY OF SCIENCE- DEPARTMENT OF CHEMISTRY			
	Examination for Seniors (Fourth year) students of biochemistry			
	COURSE TITLE:	Biological Oxidation		COURSE CODE:BC 4117
DATE: -1-18		TERM:FIRST	TOTAL ASSESSMENT MARKS: 50	TIME ALLOWED: 2 HOURS

Answer all the following questions:

- I- 1- Mention one example to be clarify ATP formation trapped energy from catabolic process (5 marks)
- 2- In the presence of enzyme, calculate the energy barrier experimentally by using two different temperatures from curve. Draw the two figures, first to be clarify calculated experimentally energy barrier, second to be clarify the difference between ΔG and energy barrier (5 marks)
- 3- Mention Mitchell and Paul Boyer hypothesis for the formation ATP from ATP synthase (5 marks)
- II- Illustrate diagram to be clarify each of the following: (25 marks)
- 1- Structure of complex V and complex I
 - 2- Electron transport from complex III to complex V in the inner mitochondria via cytochrome c
 - 3- Glyceraldehyde phosphate shuttle and translocation of ATP and phosphate.
 - 4- The sequence of reactions during light absorption to form NADPHH⁺ in green plants
 - 5- The inter-relationships between inorganic and organic nitrogen metabolism
- III- Write with chemical equation each of the following:
- 1- Trap of CO₂ in hot climate to form oxaloacetate and release into bundle sheets cell (5 marks)
 - 2- Fenton reaction and antioxidant enzyme prevent it (5 marks)

Best Wishes
Prof. EHAB M. M. ALI

1- Woman went to doctor to check up for her fetus. Doctor required some biochemical analysis as Toxoplasmosis, rubella, CMV and Rh Discuss the following: (25 marks)

- a- Complement fixation test for rubella, if this patient had rubella
- b- Draw the concentrations and types of Immunoglobulins in primary and secondary response
- c- Determine Rh by indirect Coomb's test.
- d- If mother is Rh- and baby Rh+ Discuss this type of hypersensitivity
- e- Determine the CMV virus Ab by radioimmunoassay

2- Illustrate with a diagram of the following (20 marks)

- a. First immunoglobulin that produced in primary response of immunization
- b. The thymus structure
- c. Important zones in precipitation reaction (Ag concentration vs Ag-Ab complex)
- d. Activation of neutrophil

3- Compare between: (25 marks)


- a. T helper1 and T helper 2 after Tcell activation
- b. Innate immunity in respiratory and gastrointestinal systems
- c. Sensitization and activation phase of anaphylaxis
- d. Memory and plasma cells
- e. Arthus and serum sickness

4- Give account on each of the following: (30 marks)

- a. Lymphocyte homing molecule
- b. Biological activity of complement
- c. Daman Experiment
- d. Proteins in Eosinophil
- e. Formation of secretory Immunoglobulin
- f. Genetic variation and rearrangement of H chain

أطيب التمنيات بالنجاح و التوفيق

Prof Tarek M Mohamed

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY			
	Examination for 4 th Year Biochemistry Students			
	COURSE TITLE:	Neurochemistry		
DATE: 25-12- 2017	COURSE CODE: BC4111	TERM: FIRST TERM	MARKS: 100	TIME ALLOWED: 2 HOURS

I. Discuss the following questions:

1. Explain how an action potential triggers release of neurotransmitters and indicating the stages of neurotransmitters at the synapses.
2. Show by diagram neuron structure and classification of neurons and neurotransmitters.
3. Biosynthesis and clearance of acetylcholine.
4. Relationship between glutamate, GABA and energy production in brain then indicate the GABA receptors interactions.
5. Differences between agonists, antagonists and inverse agonists.
6. Biosynthesis and degradation of catecholamines.
7. Dopamine and adrenergic receptors explaining dopaminergic agonists and antagonists.
8. Tabulate the major neurotransmitters of C.N.S and their receptors and effectors.

II. Clarify each of the following questions:

1. Chemical synapse.
2. Biosynthesis, degradation, clearance, function and dysfunction of 5HT.
3. Functions of glial cells.
4. Types of inhibition in the brain.
5. Functions and dysfunctions of dopamine and noradrenaline.
6. Excitatory amino acids act as neurotransmitters via binding three types of receptors which affected by agonists and antagonists, explain.
7. Explain the two main forms of information transduction showing types of receptors and receptors parts.
8. Compare between the excitatory and inhibitory neurotransmitters functions and dysfunctions.

III. Complete the following sentences:

1. Threshold action potential can be described as.....
2. Types of chemical transmission.....,and.....
3. Autoreceptors are.....and neuromodulators are.....
4. Myasthenia gravis is a neuropsychiatric diseases treated by using antagonist to.....which called.....drugs.
5. Posttranslational modifications affectsand.....of neurotransmitters and also.....of drugs.
6. B_{max} is.....and K_d