بسم الله الرحمن الرحيم

Sohag University
Faculty of Sciences
Department of Botany
Exam Date: Tuesday, 2/6/2015
Exam Time: 3 hrs. (9-12 am)

Final Exam of Plant Biochemistry
(Enzymes) and Virology (302 N)
For 3 rd year students of
Chemistry/Microbiology Program

Part I (Plant Biochemistry) (82.5 marks)

يرجى ان تكون الاجابات فى نفس ورقة الاسئلة كما يرجى اتباع التعليمات بالنسبة لحجم الاجابة او بالرسم فقط اذا طلب ذلك واى كتابة زائدة عن المطلوب لن ينظر اليها --- واذا كانت هناك حاجة لمساحة للكتابة يكون بظهر ورقة الاسئلة ولن يلتفت لغير ذلك

Answer All Questions

QUESTION I

Complete the missing information: (30 Marks, wach space=1 mark)

1. The elements that make up the biological molecules of living things are introduced from environment to living beings by ……………………………. and then passed along …. …………………………... and eventually are returned back to environment by ….. ………………………………...
2. The Energy captured from environment is stored and flow in living beings in the form of ………………………..……..... and when needed to operate any biochemical processes, this stored energy is transformed to biochemical enegy forms……………….……and …………………..
3. A metabolic pathway involves the step-by-step modification of an initial molecule to form another product. The end product resulting from a metabolic pathway can be used in one of three ways:
   a) …………………………... b) …………………………... or C)………,……………………
4. Enzymes are different from non-enzyme (physical) catalysts in that they:
   a) ………………………………………………………….
   b) ………………………………………………………….
   c) ………………………………………………………….
5. The enzyme type which consists of protein only is called ……………………………………….. while the type in which a non protein part is included is called ……………………………………… The complete, catalytically active enzyme is called a ………………………………….....
6. The movement of a functional group (e.g phosphate or methyl group) from one molecule to another is catalyzed by the class of enzymes called ……………………………while breaking of bonds through the addition of water belong to the class of enzymes called ……………………………. and those those calyzing the the structural changes within a molecule belong to the class of enzymes called …………………………………..

7. On the basis of how enzymes are present in the cell, enzymes are called:
    a) .... if they are anchored in membranes.
    b) .... if they are present free in cytoplasm.
8. ……………………………….……… are those enzymes which are present all times and activated and deactivated as needed, while …………………………………………..… are those enzymes which are synthesized and degraded as needed,
9. Forces causing protein folding and globular structure are:

a) ……………………………………….… b) ……………………………………………

c) ……………………………………….. d) ……………………………………………

10. The type of metabolic regulation in which the activity of an enzymes is controlled by adding a phosphate or methyl group to turn that enzyme into an active enzyme (or vice versa), is called ……………………………………..…, while the type of regulation in which end product inhibits the first enzyme in the metabolic pathway is called ……………………………………………………
11. Macromolecules resulting from associations of nucleic acid and protein are known as ……………………………… while those resulting from noncovalent linking of lipids and proteins are known as …..………………………….……...

QUESTION II

A) Check TRUE (√) OR FALSE (X) and if False underline the wrong information: (22.5 marks --- each case = 1.5 mark)

1. (………..) Building up protein molecules from smaller subunits called amino acids is considered a catabolic metabolism.
2. (………..) Adaptation of living organisms to changing environmental conditions is because of presence of more than one form of enzymes called isozymes.
3. (………..) Some enzymes catalyze more than one reaction and some enzymes are made of pure protein.
4. (………..) It is not necessary to mechanically disrupt tissues in case of extracting enzymes excreted by these tissues.
5. (………..) One of the functions of nucleic acids is energy reservation.
6. (………..) Isozymes are copies of the same exact enzyme structure without any rearrangement, deletion or addition of amino acids.
7. (………..) Enzyme activity stops irreversibly below minimum temperature.
8. (………..) Heavy metals such as lead or cyanide kill living organisms by binding irreversibly to regulatory parts of enzymes, causing change of active site and hence preventing substrates from binding to active sites of those enzymes.
9. (………..) Substrate binds with enzyme to form a reaction intermediate complex, lowering needed energy for reaction to proceed.

10. (………..) Ultracentrifugation method employed in separating enzymes from each other is based on the differences of degree of hyrophobicity among enzymes.
11. (………..) Values of the minimum, optimum and maximum 0f pH or temperature are the same for all enzymes.
12. (………..) Change of pH causes change of enzyme activity by changing of electric charges, which causes braking of hydrogen bond on enzyme body.
13. (………..) The time length needed for enzyme-catalyzed reaction to be completed is the same as that in case of non-enzymatic catalyzed reaction.
14. (………..) In medicine, some drugs are used as enzyme inhibitors and some as activators.
15. (………..) Enzymes catalyze reactions only at special conditions like high temperatures and atmospheric pressure and addition of exposure of UV.

B) Choose the right answer by circling the right choice (s) (7.5 marks --- each case = 1.5 mark).

1. **Fractional precipitation method is to separate proteins on the basis of their difference in**

   (affinity - electric charge – molecular weight – non of these).

2. **Which two of these biomolecules work in information**

   (Carbohydrates - Lipids - Proteins - nucleic acids).

3. **The enzyme part causing the enzyme specificity is**

   (apoenzyme - coenzyme – cofactor - prothetic group).

4. **Which level of the protein structure is enzymatically active**

   (primary - secondary - tertiary - quaternary).

5. **Which level of the protein structure is composed of more than one subunit**

   (primary - secondary - tertiary - quaternary).

QUESTION III

Write on each of the following: (22.5 Marks)

A. **Through your study of biochemistry as the science concerned with the study of the chemical basis of life, write in summary) on the origin, flow and cycling of energy and matter in the ecosystem. (12.5 marks) (not more than 10 lines)**

B. **Show <u>diagrammatically with labels</u> how substrate concentration affects the rate of enzymatic reaction, <u>and then write (not more than 3 lines)</u> how to determine one of the most important characteristics, of an enzyme symboled by K_m – what is the name of that constant? For what reason, it is necessary to determine K_m <u>(10 marks)</u>**

Part II (Virology) (82.5 marks)

Answer the following questions on the question paper:- (82.5 marks)

أجب عن جميع الأسئلة فى ورقة الأسئلة

I- Define: - (12.5 marks)

1. Multiparticle viruses: ………………………………………………………………….... ………..…..

   ………………………………………………………..………….………………...…………

2. Pseudovirion:

   ….……………………..………………………………………………………………….....

   ………………………………………………………………………………………..…...

3. Productive Infection:

   ……………………………………………………………………………………….…….

   ……………………………………………………………………………………………….

4. Incomplete virus:

   …………………………………………………………………………..………………..…

   ………………………………………………………………………………………………...

II Mark the following as (√) or (×):- (20 marks)

1. Most phages are naked. ( )
2. RNA viruses have smaller genome sizes than DNA viruses. ( )
3. The true infectious part of any virus is its nucleic acid. ( )
4. Some chronic diseases are due to latent viruses that persist in animal host cell. ( )
5. Prions affect the normal proteins in the cell membranes of eukaryotic cells by causing abnormal folding. ( )
6. Multinucleated cells, giant cells, and inclusion bodies are examples of cytopathic effects. ( )
7. Prion is a name given to a disease causing agent composed only of protein. ( )
8. Envelope of virus makes the initial contact with host cell. ( )
9. Lysogenic viruses do not lyse the host cell right away. ( )
10. Many animal viruses acquire their envelope from the host cell membranes. ( )
11. Viruses are considered to be the most abundant microbes on the planet. ( )
12. Variation in capsid proteins is responsible for the different viral serotypes in non-enveloped viruses. ( )
13. Most animal viruses are icosahedral symmetry. ( )
14. Naked viruses can spread easily via hands. ( )
15. Viruses can naturally replicate outside the host cell. ( )
16. Naked helical viruses are more flexible than enveloped helical viruses. ( )

17. Proteins are the major macromolecule of the viral envelope. (   )
18. Viruses which have symmetrical polygonal capsids are called complex. (   )
19. Some viruses do not have capsids. (   )
20. Most viruses can be seen with a light microscope. (   )

III. Choose the correct answer:- (20 marks)

1. **Which viral enzyme is responsible for converting a RNA genome into a DNA genome?**
   (RNA polymerase - DNA ligase - Reverse transcriptase - DNA polymerase)
2. **Which term is used to describe the process when a virus is engulfed by a cell in a vacuole or vesicle?**
   (Lysis - Budding - Endocytosis - Exocytosis)
3. **Which of the following describes the various viral "parts" coming together to produce virions?**
   (Penetration - Assembly - Absorption - Release)
4. **A simple translation of cytopathic is**
   (Cell lysis - Cell disease - Cell cancer)
5. **Identify any of the following activities which viruses typically perform?**
   (Replicate independently - Metabolize food - Replicate dependent on the host)
6. **Which of the following structures are NOT found in naked virions?**
   (Capsomers - Peplomers - Protomers)
7. **Which of the following is a term used to describe the different host cells which a virus can infect?**
   (Virus range - Compatible range - Host range)
8. **For the host cell, the lytic cycle ends when**
   (it replicates. - it bursts open. - it collapses.
9. **Plant viruses tend to have**
   (double-stranded DNA genomes - Single-stranded RNA genomes - double-stranded RNA genomes)
10. **The viral spikes typically composed of**
    (Lipoproteins - Nucleic acids - Glycoproteins)

IV- Complete the following: (10 marks)

1. Mature, naked and complex viruses are released from host cells via……………………
2. ……… is a proteinaceous infectious agent associated with spongiform encephalopathies.
3. Genome replication of most ……………..viruses takes place in the cell cytoplasm.
4. ………………………effects are changes in cells that can be observed microscopically.
5. Baltimore classification of viruses is based on the mechanism of ....production.

V- Answer the following: (20 marks)

1. **List at least three differences between viruses and rickettsias?**

2. **Briefly describe the difficulties in determining the origin of viruses?**

,, BEST WISHES ,,

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