

BITS PILANI, DUBAI CAMPUS
FIRST SEMESTER 2012-2013
COMPREHENSIVE EXAM

Course Title: General Biology
Maximum Marks: 80
Time: 3 hours

Course No.: BIO F111
Weightage: 40%
Date: 3rd January 2013

Answer Part A, B, C separately. Answer all the questions in the sequence. Answer in Points.

Part A

- Q1a. The cell can use several strategies to control the amount of mRNA translated. Justify. [4]
b. Differentiate between: **(use tabular form)** [4]
i. lactic acid and alcohol fermentation. ii. point mutations and chromosomal aberrations.
- Q2a. Photosynthesis is a biochemical pathway that involves three kinds of activities. Name these and explain how they are related to each other. [3]
b. What are co-enzymes? Explain with an example the role of coenzymes. [3]
c. How can you identify a gene of interest in a clone from a cloned library? Explain. [4]
- Q3a. Explain the role of the following [3]
i. promoter sequences ii. Non-coding strand iii. Ribosome
b. What is competitive inhibition? Explain with an example. [3]
c. What are restriction enzymes? What are the different types of restriction enzymes? Which type of restriction enzyme is used in recombinant DNA technology? Give any one example of restriction enzymes. [3]

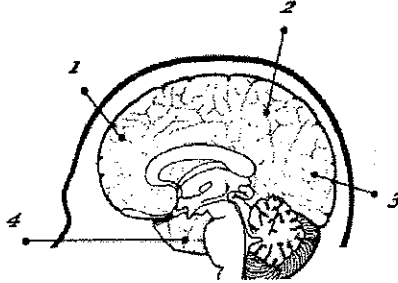
Part B

- Q1. (i) List out the consequences in case Mitosis & Meiosis goes wrong. [3]
(ii) Under what circumstances these processes go wrong and how does it happen? Explain [3]
(iii) How is it prevented in the normal human beings? Explain [4]
- Q2. (i) How do Natural killer cells and Complement Proteins differ in their way to provide protection against infection/microbes? [5]
(ii) How do T & B cells co-operate in handling the microbes/infection. [5]
- Q3. (i) As a biologist what do you think are the areas which need attention in the future? **(Answer in points only).** [3]
(ii) Mention the mechanism of transport across the membrane for the following molecules in tabular form only. [4]
Oxygen, water, Glucose, Sodium and potassium ions, mucus, Bacteria, digestive enzymes.
Vitamin A & D

P.T.O.

Part C

- Q1a. Name the hormones which are referred as regulatory proteins. Explain their role in the body control mechanisms. [3]
- b. What is omega 3 fatty acid? Mention its sources. [3]
- c. Name the coverings of Heart, brain, lung and kidney. [2]
- d. Identify and label the regions [lobes] of human brain and mention their functions. [2]



- Q2a. A female who is hemophilic carrier marries to a normal male. What type of children can they have in terms of these traits, and what is the probability for each type? *In humans, the gene for hemophilia is X-linked, recessive.* (Write steps and explain). [5]
- b. The regions of three human systems are jumbled up and given below. Arrange them in sequence in the given tabular columns. [6]

S.No	Name of the system	Regions in sequence
1		
2		
3		

body tissues, epiglottis Mega vein, descending tubule, pharynx, right auricle, rectum, tricuspid valve, jejunum, distal convoluted tubule, right ventricle, Buccal cavity, proximal convoluted tubule, loop of Henle pulmonary artery , Glomerulus tubules, ileum, distal convoluted tubule esophagus, lungs, Henel's loop pyloric stomach, large intestine, ascending tubule pulmonary vein, left auricle, cardiac stomach, collecting tubule, dorsal aorta, mitral valve, anus, left ventricle, duodenum, Bowmen's capsule

- Q3a. Write a note on archaea and its habitat. [3]
- b. What is the significance of phylogeny in the studies of evolution? [2]

*****ALL THE BEST*****

**BITS PILANI, DUBAI CAMPUS
DUBAI INTERNATIONAL ACADEMIC CITY
FIRST SEMESTER 2012-2013
Test 2 (OPEN BOOK)**

**Course NO: BIO F111
CourseTitle: General Biology**

**Maximum Marks: 40
Weightage: 20%**

Date: 25.11.2012

**Only prescribed Text book and Hand written notes are allowed.
Answer all the questions in the given sequence**

- 1a. Photosynthesis takes place in plants, algae, and some microbes. How does it affect a meat-eating animal? [3]
- 1b. Trematol is a metabolic poison derived from the plant, white snake root. Cows eating this plant concentrate the poison in their milk. The poison inhibits liver enzymes that convert lactic acid to other compounds for metabolism. Why does physical exertion increase symptoms of poisoning by trematol? Why does the pH of the blood decrease in a person who has digested trematol? [4]
- 1c. Can we call mule as a species? Justify with reason? [2]
- 1d. Following is the sequence of a double stranded DNA [1x5]
5'-ATATGCCCGCAAGACATAGCTAAGTT-3'
3'-TATACGGGCGTTCTGTATCGATTCAA-5'
- a. Write the RNA transcript for the sequence
- b. Determine the order of the amino acids in the peptide formed.
- c. A mutation occurred in the DNA and resulted in the following sequence
5'-ATATGCCTCGCAAGACATAGCTAAGTT-3'
3'-TATACGGAGCGTTCTGTATCGATTCAA-5'
- i. Locate the mutation in the sequence.
- ii. Determine the type of mutation that has occurred.
- iii. What would be the impact of the mutation on the organism?
- 2a. Which specific process in the light reactions gives rise to the waste product, O₂? [3]
- 2b. "The enzyme activity can be controlled at various level" justify, with an example. [6]
- 2c. In eukaryotes many proteins can be formed from one gene, where as in prokaryotes the concept is not applicable. Justify. [4]
- 3a. Advances in technology have improved our knowledge of living things. Outline two examples of how technological advances have affected classification systems. [2]
- 3b. Glucose is completely oxidized to CO₂ and water by a fungal cell. Starting from 6 molecules of glucose determine the net gain of ATPs by the fungal cell. (Show a stepwise calculation, do not calculate the energy generated for one molecule and multiply by 6.) [6]
- 3c. Why do maple trees exhibit beautiful red, orange color during autumn? [3]
- 3d. Explain the difficulties that can arise in classifying extinct organisms. [2]

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1st Semester 2012- 2013

General Biology BIO F111

Test – 1 (Close book)

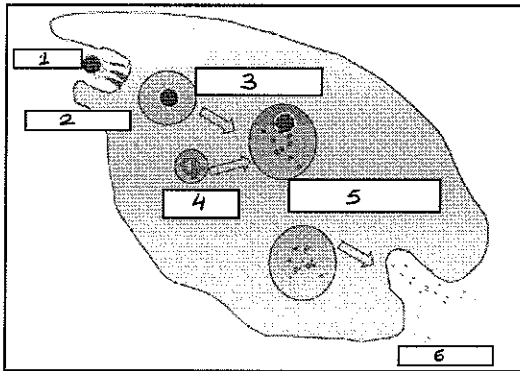
Date: 11/10/12 (Th)

Duration: 50 minutes

Weightage: 25% (Max Marks 50)

- Q1a. Cholesterol plays a positive as well as negative role in human body. Justify. [4]
- b. Streptomycin is an antibiotic generally prescribed by a doctor to treat a bacterial infection. Justify. [3]
- c. Mention the **two major** differences between the three domains of life. (**Answer in Tabular form**) [3]
- d. List the functions of the following [3]
- a. Capsule, fimbriae and cell wall in a prokaryotic cell
 - b. Golgi apparatus, nuclear pore and contractile vacuole in an eukaryotic cell
- e. Explain **any three** major functions of proteins in cell membrane. [3]

Q2a. Identify the structures numbered in the diagram and mention the process involved. [3]
(**Tabulate the results**)



- b. Explain with **two** examples the process of homeostasis in human body. [4]
- c. What are microtubules? List their functions. [4]
- d. Justify why baked cookies made with brown sugar are moist and chewy. [3]
- e. How is excessive use of pesticides linked with the decline in animal population? [3]

- Q3a. Justify, whether all the cells possess the endomembrane system. Explain its working with an example. [4]
- b. Differentiate between Active transport and facilitated diffusion in a tabular form. [3]
- c. How are mitochondria and chloroplast different from other organelles? [4]
- d. What are lysosomes? Explain their **major** functions with an example. [4]
- e. You have been given the following DNA sequence [2]

5'-ATCGGAACGTAAGT-3'

- a. Write the complementary strand for the given DNA sequence
- b. Write the RNA sequence for the given DNA sequence.

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A

1st Semester 2012- 2013

First Year

General Biology BIO F111

Quiz – 2 (Close book)

Date: 31/10/12 (Wed/4)

Duration: 20 minutes

Weightage: 7% (Max Marks 14)

Id No: _____	Name: - _____
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1. The drug Valtrex inhibits the enzyme _____, which is responsible for the production of compounds essential for viral replication. [1]

2. List the taxonomic classification of humans. [4]

3. Explain with an example the naming of enzymes. [1]

4. List two major points/ways by which fossils help in reconstructing evolutionary history. [1]

5. Give two examples of electron carriers (in expanded form) [1]

6. Give an example of a thermophilic archae. [0.5]

7. What are proton pumps? [1]

8. What are the three major lines of evolution within the protista (with examples)? [1.5]

9. What is a negative feed back inhibition? [1]

10. List the stages of viral invasion of a bacterial cell. [1]

11. _____ are chemical messengers that inform the genes of the cell's need for enzymes. [1]

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A

1st Semester 2012- 2013

First Year

General Biology BIO F111

Quiz – 1 (Close book)

Date: 25/09/12 (Tue/2)

Duration: 20 minutes

Weightage: 8% (Max Marks 16)

Id No: _____ Name: - _____ Sec: _____

1. _____ is an artificially produced hormone which is used by doctors to induce labor. [1]
2. The process of maintaining a constant internal environment is called _____. [1]
3. A Protein with one or more polypeptide chain has a _____ structure. [1]
4. A slow change in the genetic makeup of a population of organisms is called _____. [1]
5. _____ imparts structure and strength to a plant cell. [1]
6. Chemical processes involved with the building up and breaking down of food to obtain and release energy are called _____. [1]
7. A DNA double helix possesses two types of bonds, viz; _____ between nitrogenous bases and _____ between the sugar and phosphate molecules forming the backbone. [2]
8. Cholesterol is a common steroid required for the synthesis of _____. [1]
9. _____ hormone helps in increasing the blood sugar. [1]
10. Lecithin is a _____ and is found in _____. [2]
 - a. steroid / liver
 - b. lipoprotein / stomach
 - c. polysaccharide / cell membranes
 - d. phospholipid / cell membranes
11. Give an example of a protein in β - sheet configuration. _____. [1]
12. Which sequence correctly increases complexity in the level of biological organization? [1]
 - a. atoms, molecules, cells, organs, tissues
 - b. molecules, atoms, cells, organs, tissues
 - c. atoms, molecules, tissues, organs, cells
 - d. atoms, molecules, cells, tissues, organs
 - e. atoms, molecules, organs, tissues, cells
13. Dietary *trans* fatty acids increase the _____ and decrease the _____. [1]
14. When the physical and chemical properties of the proteins are changed it is called _____. [1]
