

**BITS, PILANI DUBAI**  
**FIRST SEMESTER 2007-2008**  
**COMPREHENSIVE EXAMINATION**

**COURSE NO: BIO UC 111**  
**COURSE NAME: GENERAL BIOLOGY**  
**DATE : 5<sup>TH</sup> JANUARY, 2008**

**MAXIMUM MARKS: 120**  
**WEIGHTAGE : 40 %**  
**DURATION : 3 HRS.**

Q1. (a) Classify each of the following into appropriate category of life processes

- (i) Digestion of food
- (ii) Yeast multiplication
- (iii) Plants absorbing water through roots
- (iv) Chameleon changing its color

(b) Name three classes of biomolecules, give their characteristic in a table under the following heads:

Name	Example	Monomer	Function

(c) What are viruses? How do they cause a disease? (4+6+4)

Q2. (a) List out the sequence of events when DNA message is translated to proteins

(b) List out major parts of brain and mention the function of each.

(c) List out the requirements of DNA Replication

(d) Name the membranes of Lung and Heart

(e) List out any four structures of the cell common to both the Prokaryotes and Eukaryotes. Discuss their function in brief?

(3+4+2+2+5)

Q3. (a) Why do restriction endonucleases cleave only foreign DNA while the host DNA remains undisturbed?

(b) In recombinant DNA technology, bacteria containing recombinant plasmids and gene of interest are usually identified or selected by which method, Explain?

(c) How the organelle which are named as energy converters differ from other membrane bound organelles. (List out)

(d) List out the various steps/activities in the process of Photosynthesis

(6+6+3+3)

Q4. (a) List out the various factors that affect the turnover number .How does the product formation vary with increase in enzyme concentration?

(b) How cancer can be controlled by chemotherapy?

(c) What are the major sources of variation in Meiosis? Explain in brief. (4+3+4)

Q5. (a) Hemophilia in humans is due to X chromosome mutation. What will be the result of a mating between a normal female and hemophilic male. (X linked)

(b) What is immunity? Describe in brief the various means how body provide nonspecific defense against foreign bodies?

(c) In the first step of Glycolysis, the enzyme Hexokinase uses ATP to transfer a phosphate to glucose to form G-6-P. Product continues to be oxidized forming pyruvate in Glycolysis and precursor to Acetyl CO-A for citric acid cycle. What will happen if a cell has only glucose available for energy and activity of Hexokinase is stopped in this cell? Justify? (6+8+3)

Q6. (a) Describe briefly the structure and function of Nephron

(b) Mechanism of respiration in humans

(c) Differentiate between the following:

(i) Systemic and Pulmonary circulation

(ii) Ureter and Urethra

(iii) Differentiate between Pleiotropy and Polygenic inheritance

(iv) Central nervous system and peripheral nervous system.

(v) Prokaryotic and Eukaryotic transcription? (Major differences)

(4+4+3+1+4+3+4)

Q7. Explain the following:

(a) Human HLA genes have many alleles and no two individual have the identical alleles at all the locations. What is the significance of this genetic diversity?

(b) Why the recovery of a patient with serious nerve injuries is very slow in comparison to injuries in other parts? Is there any way out with the latest technology that the patient can be made to recover fast and how?

(c) During a heart attack, blood flowing to heart muscle interrupted by blockage of a coronary artery. How would you expect the metabolism in the heart to change? (Hint: Biochemical Pathway)

(d) Explain with an example, what is competitive inhibition?

(e) How nerve cells carry information from one place to other?

(4+4+4+4+5)

----- GOOD LUCK -----

**BITS PILANI DUBAI, ACADEMIC CITY**

**FIRST SEMESTER 2007-08**

**TEST -2 (OPEN BOOK)**

**COURSE NO.: BIO UC 111**

**MAXIMUM MARKS: 60**

**COURSE NAME: GENERAL BIOLOGY**

**MAXIMUM TIME: 50 min.**

**DATE - 16.12.2007**

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- Q1. (a) What is the probability of a child having type AB blood group if one of the parent is heterozygous for A blood group and other is heterozygous for B. (8)**
- (b) If both the parents are heterozygous for earlobe shape and nature of the hair, what is the possible outcome of this cross? (allele for free earlobe shape is dominant over attached and allele for straight hair is dominant over curly hair) (12)**
- (c) Why does Synapsis not occur during meiosis-II? ( One point) (2)**
- Q2. (a) How normal cells are prevented from being cancerous? (6)**
- (b) What are the major differences between Mitosis and Meiosis II? (6)**
- (c) What is the genetic significance of the fact that gametes contain half of the chromosomes complement of somatic cells? (4)**
- (d) How age of mother is related to trisomy? (6)**
- Q3. (a) What is unique about prophase -1of Meiosis? (2Points) (2)**
- (b) How is it possible that a point mutation consisting of a replacement/ substitution of a single nitrogenous base in DNA by a different base might not result in an error in protein production. Justify with an example. (5)**
- (c) There are thousand of genes in a cell and each gene code for different protein. How does a cell know which gene should be expressed, how much of gene should be expressed and when it should be expressed? (5)**
- (d) A normal protein has 323 amino acids, a mutant is isolated which has 416 amino acids what has probably happened to produce this large mutant protein? (consider all possibilities) (4)**

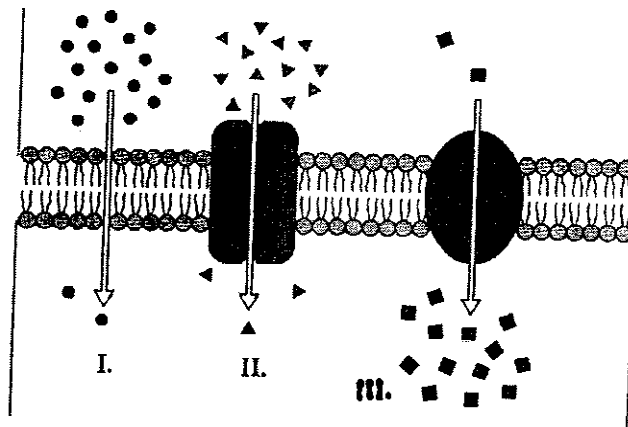
-----GOOD LUCK-----

**BITS PILANI DUBAI, ACADEMIC CITY**  
**FIRST SEMESTER 2007-08**  
**(TEST -1) 11.11.07**

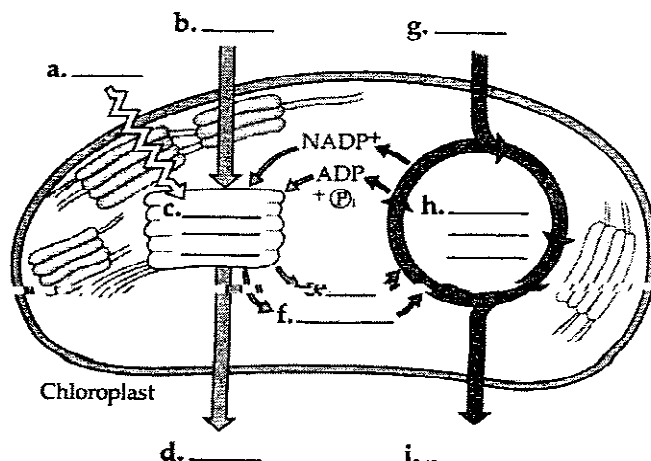
**COURSE NO.: BIO UC 111**  
**COURSE NAME: GENERAL BIOLOGY**

**MAXIMUM MARKS: 75**  
**MAXIMUM TIME: 50 min.**

- Q1. (a) What are control processes? Explain with the help of an example (6)**  
**(b) List out in a tabular form how DNA differs from and similar to RNA both structurally and functionally? (6)**  
**(c) List out various types of proteins and write one function of each. (6)**  
**(d) List out two diseases that are caused due to improper folding of proteins. (2)**
- Q2. (a) Using HIV as an example, with the help of flow chart show the process of virus infection and multiplication. (6)**  
**(b) What do you understand by LDL, VLDL and HDL? Which out of these is most concerned and why? (6)**  
**(c) Enzymatic inhibition can be used to control diseases, Justify? (8)**  
**(d) Differentiate between the following: (8)**  
**(i) Lysosomes and Peroxisomes**  
**(ii) Cilia and Flagella**  
**(iii) Rough Endoplasmic Reticulum and Smooth Endoplasmic Reticulum**  
**(iv) Plant cell and animal cell (2 points)**
- Q3. (a) Why is no oxygen generated by cyclic electron flow/ photophosphorylation? (4)**  
**(b) Explain the process of electron transport system (maximum 3 points) and why there is a difference in total no. of ATP's produced in Eukaryotes and prokaryotes in aerobic cellular respiration? (6)**  
**(c) Refer to the following diagram and name the important concepts / processes (8) depicted in this diagram and give brief description (point wise) of labels I, II, III.**



- (d) Label the following diagram and name the process (9)**



- a. \_\_\_\_\_  
 b. \_\_\_\_\_  
 c. \_\_\_\_\_  
 d. \_\_\_\_\_  
 e. \_\_\_\_\_  
 f. \_\_\_\_\_  
 g. \_\_\_\_\_  
 h. \_\_\_\_\_  
 i. \_\_\_\_\_