

BITS PILANI DUBAI CAMPUS
DUBAI INTERNATIONAL ACADEMIC CITY
FIRST SEMESTER 2011-20112
Compre exam Date: 07.1.2012

CourseTitle: General Biology

Course NO: BIO C111/ F111

Maximum Marks: 80

Weightage: 40%

Duration: 3 hours

Attempt all the questions in the given sequence

Section A

- Q1 (i) If the chromosomes fail to separate or segregate properly, it can result in genetic abnormalities. Justify the statement with 2 examples. [4]
- (ii) How does Independent assortment contribute towards generating genetic diversity in a given population? Explain. [3]
- (iii) How does a cell get to know whether to proceed for cell division or not? Explain with an example. [3]
- Q2. (i) During organ transplantation, why do the doctors ask that the donors should be arranged from the immediate members of the family or close relatives of the patient? [3]
- (ii) How do the B cells and T cells respond to a given pathogen/antigen (bacteria or virus) in your body? Explain schematically. [4]
- (iii) List out the various components of specific and non specific immunity in a tabular form. [3]
- Q3. (i) List out the requirements of a genetic engineering or Recombinant DNA technology experiment and mention for what purpose are they used? (Answer in a tabular form only). [3]
- (ii) Differentiate between the following in a tabular form [3]
- (a) Plasmid and Phages (3 major points only)
- (b) Genomic DNA and c DNA library (2 major points only)
- (iii) Two plasmids were used at 2 different research centers to clone a disease resistance gene (foreign DNA). In one of the plasmids there are 2 antibiotic resistance gene sites (One site for ampicillin and other site for Tetracycline), in this plasmid the foreign DNA is placed in the Ampicillin Resistance gene site, the other plasmid has LacZ site and foreign DNA is cloned in LacZ site. Being a student of biology how will you check whether the foreign DNA is cloned in these two plasmids or not. Explain the method of doing so? Write the steps. [4]

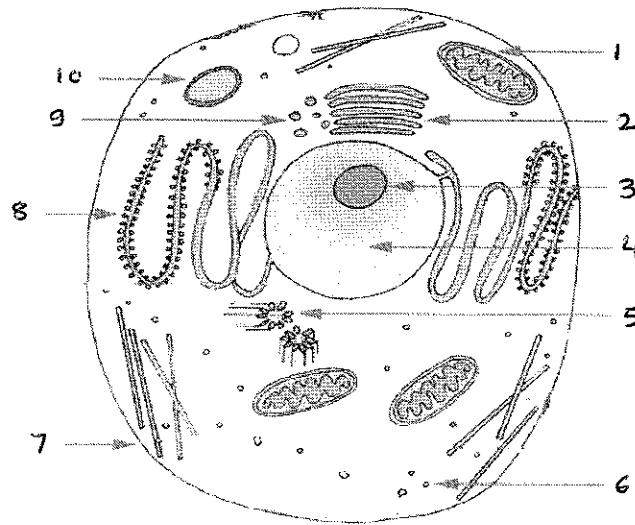
Section B

- Q1a. Differentiate between: i. Saturated and unsaturated fatty acids; ii. Structural and regulator proteins [3]
- b. Cystic fibrosis is a recessive condition that affects about 1 in 2,500 babies in the Caucasian population of the United States. Calculate the following. [3]
- The frequency of the recessive allele in the population.
 - The frequency of the dominant allele in the population.
 - The percentage of heterozygous individuals (carriers) in the population.
- c. Explain the events that occur in the electron transport system. [4]
- d. Explain with an example the industrial importance of alcohol fermentation [2]
- e. Explain the processes that drive natural selection. [3]
- Q2a. Explain briefly the light independent events during photosynthesis. [3]
- b. Marian's father is colorblind, as is her maternal grandfather (her mother's father). Marian herself has normal color vision. Marian and her husband, Martin, who is also colorblind, have just had their first child, a son they have named Mickey. Answer the following questions about this small family. [3]
- What is the probability that this child will be colorblind?
 - Three sources of the colorblindness allele are mentioned in this family. If Mickey is colorblind, from which of these three men (Marian's grandfather, Marian's father, or Martin) did he inherit the allele?
 - If Martin were not colorblind, how would this affect the prediction about Mickey?
- c. Insertion and deletion mutations are more detrimental than point mutations. Justify. [3]
- d. What is negative feedback inhibition? [3]
- e. List the key enzymes involved in DNA replication. Mention the role of each. [3]

SECTION – C

- Q1. Write the differences between: [4]
- Taxonomy & Phylogeny
 - Erythrocytes & Leucocytes
 - Neuron & Nephron
 - Corpus callosum & Corpus Luteum
- Q2. Write the role of diaphragm and intercostal muscles in the process of respiration [4]
- Q3. Explain how fat absorption is different from absorption of carbohydrates and proteins? [2]
- Q4. Both Nervous system and endocrine system helps in body control mechanism, but what way they differ from each other in their action. [2]
- Q5. Write the role of ADH in excretion [3]

Q6. Identify the organelles from the diagram and match with their structure and function in the tabular form as mentioned below: [10 x ½ = 5]



Sl No	Organelles identified	Structure	Function
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

BITS PILANI DUBAI CAMPUS
DUBAI INTERNATIONAL ACADEMIC CITY
FIRST SEMESTER 2011-20112
Test 2 (OPEN BOOK)

Course No: BIO F111/ C111
CourseTitle: General Biology

Maximum Marks: 40
Weightage: 20%

Date: 04.12.2011

Attempt all the questions in the given sequence

- Q1
- a. Why is food stored at lower temperatures? [2]
 - b. Why is mRNA formed from the DNA in the first step of protein synthesis? Why can not the DNA directly get converted into proteins? [4]
 - c. Glyceraldehy-3-phosphate is the only product of photosynthesis. How are the other macromolecules formed in the cell starting from glyceraldehydes-3-phosphate? [3]
 - d. Can a sugar molecule and a fat molecule be metabolized by the same enzyme? Justify your answer. [3]
- Q2
- a. Fats are preferred over carbohydrates as storage molecules by cells. Justify. [4]
 - b. Glucose is completely oxidized to CO₂ and water by a yeast cell. Starting from 8 molecules of glucose determine the net gain of ATPs by the yeast cell. (Show a stepwise calculation, do not calculate the energy generated for one molecule and multiply by 8.) [8]
 - c. In an enzymatic reaction pyruvate is being converted to lactate by the enzyme lactate dehydrogenase. Suggest the different alternatives for increasing the rate of the reaction. [4]
- Q3
- a. The events occurring during photosynthesis are interdependent. Justify. [5]
 - b. Following is the sequence of a double stranded DNA [7]
5'-CTG ATG ATT GGC ATT TAAT CCG TAC GCA TAA GAC-3'
3'-GAC TAC TAA CCG TAA ATA GGC ATG CGT ATT CTG-5'
 - i. Write the RNA transcript for the sequence
 - ii. Determine the order of the amino acids in the peptide formed.
 - iii. A mutation occurred in the DNA such that the new mRNA formed had the following sequence. Locate the mutation and name the type of mutation
– CUG-AUG–AUU-GGC-AUU-UAU- CCA-UAC –GC A-UAA-GAC-

BITS PILANI DUBAI CAMPUS
DUBAI INTERNATIONAL ACADEMIC CITY
FIRST SEMESTER 2011-2012
TEST – I (CLOSED BOOK)

COURSE NO.: BIO C111

09.10.11

MAXIMUM MARKS: 50

COURSE TITLE: General Biology

DURATION: 50 Minutes

Answer to the point; Answer all questions in the given sequence

- Q1a. Explain with two examples the process of homeostasis. [4]
b. How do proteins help in regulating the sugar levels in the blood? [3]
c. Most cells are very small in size. Justify. [3]
- Q2a. Introduction of exotic animals, birds or plants is not encouraged. Justify with an example. [3]
b. Classify the proteins on the basis of their function. Give one example of each. [4]
c. What is the fluid mosaic model? List the major molecules found in the cell membranes and mention their functions. [4]
d. What is osmosis? What would happen to the animal cell when suspended in a hypertonic solution? [3]
- Q3a. Significant knowledge in biology has improved our living standard. List any three examples to justify the same. [3]
b. Plant based diets do not contribute as a major source of energy in humans, but are still preferred and consumed. Justify. [3]
c. Differentiate with two major points between the following. [4]
i. Rough ER and Smooth ER ii. Energy converters and the other membranous organelles
iii. Flagella and cilia iv. Facilitated diffusion and active transport
d. Give an example of each [5]
i. Disaccharide ii. Protein exhibiting quaternary structure iii. Essential fatty acid
iv. Phospholipids used in emulsification of fats v. Nitrogenous base
- Q4a. Give the salient features of a Prokaryotic cell [3]
b. What are the different types of RNA? Mention the function of each. [3]
c. Tabulate the non membranous organelles and mention their functions [4]

BITS Pilani – Dubai Campus

1st Semester 2011- 2012

First Year (Sec 1, 3 & 5)

General Biology (BIO F111)

Quiz – 2 (Closed book)

Date: 21/11/11 (Mon/7)

Duration: 20 minutes

Weightage: 7% (Max Marks 14)

Id No: _____ Name: _____ Sec: _____

FILL IN THE BLANKS:

(6 x ½ = 3 mark)

- The two muscles which regulates the breathing process are _____ and _____
- Exchange of gases in the lungs is carried out by the process called _____
- The structure which closes off the larynx is _____
- The final portion of the small intestine is referred as _____
- The pancreatic duct transports its secretions from the pancreas in to _____
- Most of the oxygen in the blood is transported to various tissues as _____

CHOOSE THE ODD CORRECT ANSWER(S) FROM THE OPTIONS GIVEN AND UNDERLINE IT: (6 x ½ = 3 mark)

- Which of the following describes a correct order of structures in the respiratory pass ways?
 - Pharynx, trachea, larynx, bronchi, bronchioles
 - Larynx, pharynx, trachea, bronchioles, bronchi
 - Trachea, pharynx, larynx, bronchi, bronchioles
 - Pharynx, larynx, trachea, bronchi, bronchioles
- Which of the following is NOT an accessory structure of the digestive system?

Liver Gallbladder Pancreas Spleen
- Which portion of the nephron does not absorb water passively by osmosis?
 - Proximal convoluted tubule
 - Descending limb of nephron loop
 - Distal convoluted tubule
 - All of these portions absorb water passively by osmosis
- What affect does ADH have on urine output?

Minimal increases decreases maintains
- Most tubular reabsorption in nephron occurs at the

Loop of Henle Distal convoluted tubule proximal convoluted tubule glomerulus
- The renal pyramids are areas located within the _____ of the kidney

Cortex pelvis capsule medulla

WRITE PRECISELY:

(2 x2 = 4 marks)

- Mention four important functions of liver

I.

II.

III.

IV.

PTO

14. What is Emphysema?

WRITE THE DIFFERENCES BETWEEN

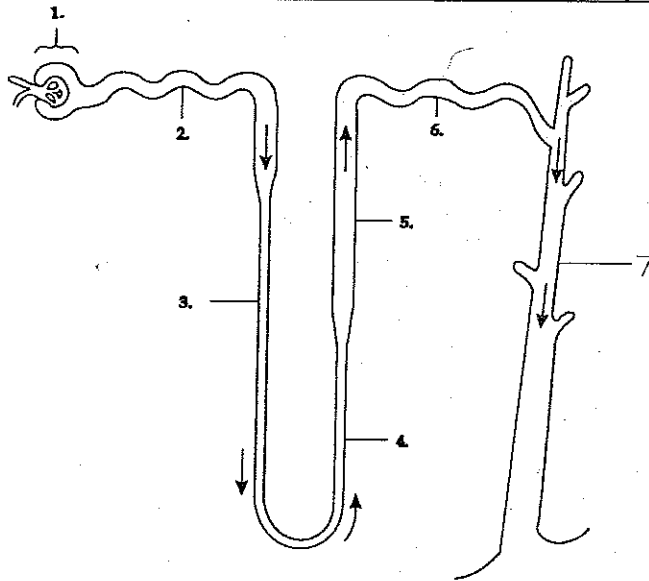
15. Ureter and urethra

(2 x 1 = 2 mark)

16. Emulsification and micturition

17. Identify the regions of the nephron and mention the major functions

(2 marks)



Major Functions			
Name the regions / parts			

"ALL THE BEST"

Id No: _____ Name: - _____ Sec: _____

Fill in the blanks:

(10 x ½ = 5 marks)

- The thinnest blood vessels that exchange materials between the blood and tissues that surrounds the vessesls are referred as _____.
- Name the enzyme which helps convert CO₂ in to bicarbonate ions _____.
- Breakdown product of heamoglobin from RBC is _____.
- The flow of blood through certain chambers of heart and blood vessels to tissues and back to heart is referred as _____.
- The voltage difference between inner and outer side of nerve cell membrane is _____.
- Name the potent androgenic hormone produced chiefly by the testes; responsible for the development of male secondary sexual characters _____.
- Apart from the four traditional tastes, recently a new tase has been identified in human. Name it.
_____.
- A set of organs associated with the cochlea that sense changes in the movement / position of the head is _____.
- The typical pressure recorded while heart is relaxing is _____.
- Mention any one of the granule-containing leukocytes _____.

Under line the correct answer(s) from the options given :

(2 x ½ = 1 mark)

- Tricuspid valve is located on

a. Right auriculo ventricular septum	b. Left auriculo ventricular septum
c. Inter auricular septum	d. Inter ventricular septum
- Caronory arteries supplies blood to

a. Cornea	b. Cortex	c. Heart	d. Head
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write a note on the following terms:

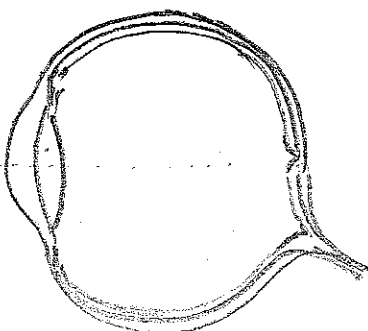
(5 x 1 = 5 marks)

- Varicose veins
- Schwann cells
- Gyri and sulci
- Oxytocin
- Pineal body

Write precisely:

(4 x 1 = 4 marks)

- Mention any two ways how the CO₂ is carried in the blood.
- Mention any two functions of lymph.
- Name any two neuro transmitters.
- Mention any two functions of hypothalamus region of the brain.
- Name and mark the most acute vision region and neutritive Layer in the given diagram. (2 x ½ = 1 mark)



"All the best"