

BITS Pilani, Dubai Campus

1st Semester 2013-2014

General Biology BIO F111

Compre Exam

Date: 31/12/13 (T)

Duration: 3 hours

Weightage: 40% (Max Marks 80)

Answer all the questions in a sequence. *Answer Part A, B & C on separate answer sheets.*

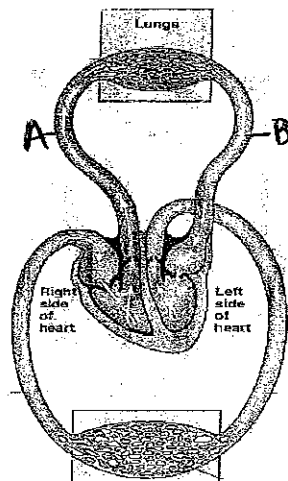
PART A

- Q1a. Write a note on Binomial nomenclature. [3]
 b. Briefly explain the breathing process in human being. [4]
 c. Give the importance of the following [3]
 i. Kinetochore ii. P53 proteins iii. Turnover number

- Q2a. Differentiate between Anaphase in Mitosis and Anaphase 1 in Meiosis. [1.5]
 b. Explain the effect of temperature on the enzyme activity. [2.5]
 c. Classify the following regions / parts into the appropriate systems in the tabular column. [6]
 Parotid gland, Glomerulus tubules, Myelinated sheet, Proximal convoluted tubule, Appendix, Nodes of Ranvier, Pia matter, Colon, Ascending tubule, Acetyl.cholinesterase, Pancreas, Bowmen's capsule, Ileum, Dentrite, Ureter

| | | System | |
|---------|--|--------|--|
| Regions | | | |
| | | | |
| | | | |
| | | | |
| | | | |

- Q3a. List out the major four evidences used to establish phylogenetic relationships. [4]
 b. Identify **A & B** in the given diagram and Mention their significance. [3]



PTO

PART B

- Q1a. Justify, "Fats generate more energy than carbohydrate during catabolism". [3]
b. What are chromosomal aberrations? Explain their different types. [1+2]
c. What are the four degrees of protein structure? Explain each level with an example. [4]
- Q2a. Differentiate between: [2+2]
i. steroids and phospholipids ii. Facilitated Diffusion and active transport
b. Explain the concept of signal transduction with an example. [3]
c. Explain the process of transcription in a cell? [2]
- Q3a. Mention the role of the following [2]
i. Golgi Apparatus ii. Stop codons iii. Microfilaments iv. Rubisco
b. What are the different enzymes involved in DNA replication. Explain their role. [2]
c. Justify, "Glyceraldehyde-3-Phosphate is an important molecules that forms a link between eh anabolic and catabolic processes". [3]

PART C

- Q1. Hemophilia is a sex-linked trait where X^H gives normal blood clotting and is dominant to the hemophilia allele X^h .
a. Give the genotypes of 1) a woman with normal blood clotting whose father had hemophilia and 2) a normal man whose father had hemophilia.
b. What is the probability that a mating between these two individuals will produce a child, regardless of sex, that has hemophilia?
c. If this couple has a daughter, what is the probability that the daughter will be a carrier of the hemophilia trait?
d. What is the probability a daughter would have hemophilia?
e. If this couple has a son, what is the probability he will have hemophilia? [2+2+1+1+2=8]
- Q2. (i) How does cells and proteins circulating in our blood stream help protecting us from viral and bacterial infections, explain with one example for each type of infection. [2+2=4]
(ii) Differentiate between B lymphocytes and T lymphocytes in general and how does the recognition of an antigen differ (in specific, Explain in points) [2+2=4]
- Q3. (i) Explain the concept of Insertional inactivation with an example studied by you and what is the purpose of doing so? [4]
(ii) What are the natural sources of restriction endonucleases? How do they function in host organism? Explain the role of Restriction endonucleases in gene technology /Recombinant DNA technology [1+2+2=5]
- Q4. List the different types of responsive processes. [2]

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

BITS Pilani Dubai Campus
1st Semester 2013-2014
General Biology BIO F111
Test – 2 (Open book)

Date: 10/11/13 (Su7)

Duration: 50 minutes

Weightage: 20% (Max Marks 40)

Answer all the questions in a sequence

Q1a. If in mitosis the parent cell has 15 chromosomes, the resulting daughter cells will have how many chromosomes? Justify your answer. (2)

b. Justify the statement, 'RBC's have a short life of 120 days'. (2)

c. Methanol is oxidized by Alcohol dehydrogenase (ADH) found in Liver and other tissues, to the highly toxic compound Formaldehyde. Drinking methanol is fatal because of the production of Formaldehyde. Methanol can be excreted out by the kidneys. ADH also oxidize other alcohols such as Ethanol.

Methanol is ingested by an individual by mistake; propose a way to treat the individual. (Explain the concept involved) (4)

d. Some of the viral infections go unnoticed / unrecognized, justify the statement with an example: (2)

Q2a. The concentration of glucose in drips solution that is administered to the patients is 5% (isotonic with blood plasma) what could be the likely physiological effects of administration 10% solution of glucose? (4)

b. How is our genome guarded from the damages that take place from various sources/means in our day to day life? (4)

c. In guinea pigs, the allele for short hair is dominant. Perform a cross for the guinea pigs considering one partner as homozygous dominant and another heterozygous. What percentage of offspring will have short hair? (Explain with a Punnet square) (2)

Q3a. How do chemotheapeutic drugs help control cancer? (2)

b. Briefly comment on the specificity of enzyme action. (Are the enzymes reaction specific or substrate specific?) Explain your answer with respect to the model/hypothesis of enzyme specificity. (4)

c. An injury to the spinal cord results in a permanent damage to an individual whereas simple cuts wounds or cuts to other parts of the body are healed quickly. Justify. (2)

d. Person's susceptibility to acquire infectious protein based disease depends on his genetic makeup, justify. Give an example of such a disease. (2)

Q4a. Phenylketonuria is caused by recessive allele with simple Mendelian inheritance. A couple intends to have children but consults a genetic counselor because the man has a sister with PKU and woman has a brother with PKU. There are no other known cases in the family. They ask the genetic counselor to determine whether any of their children will have PKU? (Explain and justify your answer with a Punnet square) (7)

b. What is the endosymbiotic hypothesis about the origin of mitochondria? What are the molecular facts that support the hypothesis? To which other cellular organelles can the hypothesis also be applied? (3)

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

BITS Pilani, Dubai Campus

Instructions Division

1st Semester 2013-2014

General Biology BIO F111

Test – 1 (Close book)

Date: 22/9/13 (Su)

Duration: 50 minutes

Weightage: 25% (Max Marks 50)

Answer all the questions in a sequence

Q1a. List the characteristics of life and illustrate each with an example. (Please tabulate your answers). [10 marks]

b. Lactose and sucrose are both disaccharides, but lactose is one sixth as sweet as sucrose. Justify. [2marks]

Q2a. Differentiate between the following: [8 marks]

- i. anabolic and catabolic processes
- ii. saturated and unsaturated fatty acids
- iii. co-ordination and regulation
- iv. DNA and RNA

b. Explain briefly how blood glucose is regulated in our body. [4 marks]

Q3a. Suggest some future directions in biology for a better tomorrow. [3 marks]

b. Classify proteins as per the level of their structure. Quote an example for each level. [8 marks]

c. Atherosclerosis can be prevented by following a strict diet. Justify. [2marks]

Q4a. Depict the structure of a DNA double helix, label the strands and mention their functions. [4 marks]

b. Why is insulin stored in amber colored bottles? [2marks]

c. How does the introduction of exotic species harm the ecosystem? Explain with an example. [3marks]

d. Mention any four important functions of lipids. [4marks]

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

BITS PILANI, DUBAI CAMPUS
DUBAI INTERNATIONAL ACADEMIC CITY
FIRST SEMESTER 2013-2014

A

QUIZ-2

COURSE NO.: BIO F111
TITLE: GENERAL BIOLOGY

1st December 2013

MAXIMUM MARKS: 14
DURATION: 20 min.

Name: _____ ID NO. _____ Section: _____

Q1. Cells spend most of their time in _____ phase. [0.5]
A) Cytokinesis B) meiosis C) Mitosis D) Interphase

Q2. List out the various leukocytes, state the major mechanism by which they help in eliminating the pathogens and thereby providing protection. [1]

Q3. Once transcription is completed, which one of the following is **NOT** necessary for protein synthesis? [0.5]
(i) tRNA (ii) ribosomes (iii) mRNA (iv) DNA

Q4. Out of the following sets, which one is correct for stop signals for protein synthesis [0.5]
(i) UGA, GAG and GUU (ii) UAA, UAG and AUG
(iii) UAA, UUU & AUG (iv) UAA, UAG & UGA

Q5. What is the role of ribosomes in protein synthesis [0.5]

Q6. In a eukaryotic cell, where is messenger RNA synthesized? _____ [0.5]

Q7. _____ enzyme binds to _____ region during transcription of DNA. [0.5]

Q8. DNA replication results in [0.5]
(i) Completely 2 new strands of DNA molecule (ii) 1 new DNA, one old DNA
(iii) 2 DNA molecules, each containing a strand of the original (iv) 1 new molecule of DNA

Q9. Which factor(s) do not contribute to genetic variation in off-springs? [0.5]
A) Mutation B) Segregation C) Apoptosis D) Independent Assortment E) Metastasis

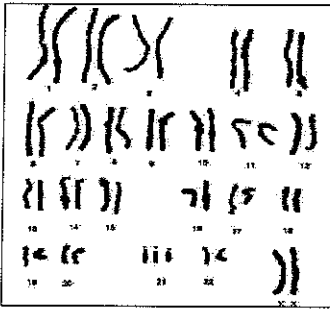
Q10. Write the important differences between Anaphase in mitosis and Anaphase in meiosis [1]

| Anaphase in mitosis | Anaphase in meiosis |
|---------------------|---------------------|
| | |
| | |

Q11. Which type of molecule is produced by viral-infected cells to communicate to non-infected cells of the presence of a virus? _____ [0.5]

Q12. Comment on the under mentioned diagram

[1]



Comments:

Q13. Meiosis results in _____

[0.5]

- A) 2 haploid daughter cells
- B) 4 haploid daughter cells
- C) 2 diploid daughter cells
- D) 4 diploid daughter cells

Q14. Which of the following distinguishes prophase 1 of meiosis from prophase of mitosis?

[0.5]

- A) homologous chromosomes pair up
- B) spindle forms
- C) Nuclear membrane breaks down
- D) chromosomes become visible

Q15. Active artificial immunity is a result of _____.

[0.5]

Q16. Saliva contains _____ enzyme that destroys bacteria.

[0.5]

Q17. The immune cell that allows for subsequent recognition of an antigen resulting in a secondary response is called a (an) _____.

[1]

Q18. A frameshift mutation

[0.5]

- a. Replaces one amino acid with another.
- b. removes part of the protein.
- c. Introduces a section of amino acids not normally found.
- d. joins two different proteins.

Q19. Give the role/s of DNA polymerase.

[1]

Q20. What is the difference between gene mutation and chromosomal aberration?

[0.5]

| Gene mutation | Chromosomal aberration |
|---------------|------------------------|
| | |

Q21. When a localized area exhibits increased capillary filtration, redness and swelling, it is an indication that

[0.5]

- a. Inflammation is occurring
- b. antigens are presenting
- c. Antibodies are phagocytizing the target
- d. an immune response is underway
- e. Fever is developing

Q22. _____ cells phagocytize antigen-bearing cells, bind them to their MHCs and present to T cells.

[0.5]

Q23. Which nonspecific defense cells specialize in attacking cancer cells and virus-infected cells? _____ [0.5]

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

BITS, PILANI –DUBAI
DUBAI INTERNATIONAL ACADEMIC CITY
FIRST SEMESTER 2013-2014
QUIZ-1 [20.10.13]

COURSE NO.: BIO F111
TITLE: GENERAL BIOLOGY

MAXIMUM MARKS:16
DURATION: 20 min.

Name: ID NO. Section:
.....

Q1. In the binomial nomenclature, which one of the following is correct scientific name of an organism?

- (a) panthera tigris
- (b) Panthera tigris
- (c) Panthera tigris
- (d) Panthera tigris

[0.5]

Q2. Ribosomes are composed of _____ and _____. [0.5]

Q3. List out the **2 major points** of differences that proves Mitochondria and chloroplast are different from other membranous structures [1]

Q4. In humans, there is a group of protein molecules on the cell surface. These molecules help in tissue matching during tissue transplant. These are called _____ [0.5]

Q5. List out the components of nucleus. [0.5]

Q6. Internal structural framework or cytoskeleton of a cell is composed of _____ combination of elements. [1]

Q7. Arrange the following in their hierarchical order.
Family, order, Domain, genus, kingdom, species, phylum, class [1]

Q8. _____ manufactures some polysaccharide, lipids and packages molecules within sacs. [0.5]

Q9. List out the **2 major points** of differences between Lysosomes and Peroxisomes [1]

Q10. List out 2 major functions of proteins in the cell membranes. [1]

Q11. Name the term which refers to the classification of organism on the basis of evolutionary relatedness? [1.0]

Q12. Organisms belonging to Domain Eubacteria reproduces by _____ [0.5]

Q13. Name the organelle composed of membranes but incapable of interconversion [1]

Q14. What is the arrangement of microtubules in the organelle like Centrioles and cilia flagella? [1]

Q15. What is the composition of cell wall in the following: / Cell wall is made up of ----- in

- Plant cell
 - Bacterial cell
 - Fungal cell / Fungi
- [1.5]

Q16. Organisms found in Sewage and swamps are known as _____ and belong to Domain _____ [1]

Q17. Match the column A with column B [2.5]

| A | B |
|-------------------------|-------------------------------------|
| 1. Vitamin D | Pinocytosis |
| 2. Liquids | Mitochondria |
| 3. DNA analysis | Prokaryotes |
| 4. Na, K ions | Diffusion |
| 5. Glucose | Chloroplast |
| 6. Aerobic Respiration | Phagocytosis |
| 7. 70 S Ribosomes | Active transport |
| 8. 80S Ribosomes | Establish phylogenetic relationship |
| 9. Solid food particles | Eukaryotes |
| 10. Photosynthesis | Facilitated diffusion |

Write your answers here: