

BITS PILANI DUBAI CAMPUS
DUBAI INTERNATIONAL ACADEMIC CITY
SECOND SEMESTER 2011-2012
COMPREHENSIVE EXAMINATION

COURSE NO.: BIO F111

7.5.12

MAXIMUM MARKS: 80

COURSE TITLE: General Biology Weightage (40%)

DURATION: 3 Hours

- Attempt part A and Part B in separate answer sheets
- Answer to the point , Answer all questions in the given sequence only

PART- A

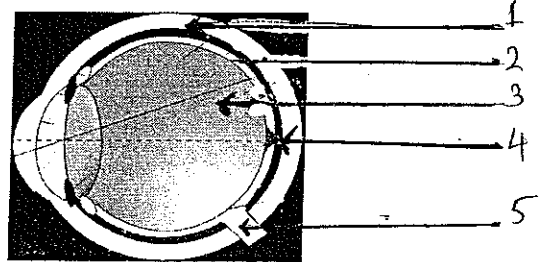
Q1. (a) Identify the following parts given in the diagram (2.5)

(b) Arrange the digestive tract in a proper order: (1.5)

Cardiac stomach, rectum, Oral cavity, epiglottis, pharynx, oesophagus, pyloric stomach, duodenum, large intestine.

(c) Compare and contrast between (6.0)

- (i) Facilitated diffusion and active transport
- (ii) Transcription process and the replication processes
- (iii) Natural Killer cells and Complement proteins



Q2. (a) Suggest the possible phenotypes and phenotypic ratio of the progeny when one of the parents is heterozygous for the color of the eyes and type of the hair and the other parent is homozygous for Brown eyes and heterozygous for the hair type. (Allele for Brown eyes is dominant over the allele for blue eyes & straight hair is dominant over curly hair) (6.0)

(b) Why is it said that the enzymatic action is highly specific? Justify (2.0)

(c) Cancer patients undergoing chemotherapy have hair loss and damaged gut lining , why do you think hair root cells and cells lining the gut are most affected ? (2.0)

Q3. Briefly explain the following

(a) Why are salt and sugar used in the production of dried meat and dried fruits? (2.0)

(b) How does the PH of blood interfere with the rate of breathing? (3.0)

(c) Why is meiosis important for the maintenance of the normal quantity of chromosomes of a species with sexual reproduction? (2.0)

Q4. (a) How is the photic energy absorbed by chlorophyll transferred to ATP molecules in photophosphorylation? How will be the resulting ATP used? (4.0)

(b) What is protein denaturation? Is there any change in the primary structure when a protein is denatured? (2.0)

(c) What is adenohipophysis? List out the hormones secreted by it. (3.0)

(d) The main respective constituents of cell walls in bacteria, protists, fungi and plants (4.0)

PTO

PART -B

Q1. Briefly explain the following

- (a) Under what conditions are lipids used as an energy source by the organism? (2.0)
- (b) What could be the mechanism of action of the antiretroviral drugs called protease inhibitors which are used against HIV infection? (4.0)
- (c) Is it possible for any son of a couple formed by a hemophilic man (XhY) and a nonhemophilic noncarrier (XX) woman to be hemophilic? (3.0)

Q2. (a) Mistakes may happen during every copying process. The same is true for DNA replication. (5.0)
Are there correction systems in cells that try to fix those mistakes? Under which situation are the mistakes carried only by the individual owner of the cell within which the mistake has occurred and in which situation are they transmitted to the offspring? Explain

- (b) Since pepsin is a gastric enzyme does it have an acid or basic optimum pH? What happens to pepsin when it passes into the duodenum? (2.0)
- (c) How can an organism that underwent contact with an antigen/pathogen be immunized against future infections by the same antigen? (3.0)

Q3. (a) How many ATP molecules are produced for each glucose molecule used in fermentation and for each glucose molecule used in aerobic respiration? (2.0)

- (b) Why are lysosomes known as "the cleaners" of the cell waste? (3.0)
- (c) Define the type of immunity which is conferred by a mother to the child. In which way is this immunity conferred and will it be a long lasting immunity (3.0)

Q4. (a) List out the salient features a plasmid must have to be used as a vector (4.0)

(b) What do you mean by blue and white screening and for what purpose it is used? (5.0)

(c) Indicate to which branch of the immune system the following statements apply. Write H for humoral, CM for cell mediated and B for both against the corresponding serial number given in the question. (4.0)

- (i) Involve CD⁸ cells (ii) Involves Th cells (iii) Involves B cell (iv) Involves secreted antibodies.

**BITS PILANI DUBAI CAMPUS
DUBAI INTERNATIONAL ACADEMIC CITY
SECOND SEMESTER 2011-2012
TEST – 2 (OPEN BOOK)**

COURSE NO.: BIO F111

26.4.12

MAXIMUM MARKS: 40

COURSE TITLE: General Biology Weightage (20%)

DURATION: 50 Minutes

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

Q1a. During metabolism of Alcohol, in one of the reactions, the enzyme Alcohol dehydrogenase picks up Hydrogen ions and attaches it with NAD. What would happen if NAD is not there and how is the end product affected. [3]

b. Why is water necessary for the overall process of Photosynthesis? [4]

c. Pepsin was used in an enzymatic reaction to break down proteins in a test tube, the reaction failed. Can you suggest the probable reason for failure of the reaction? [2]

Q2.a Six molecules of Stearic acid undergo complete fatty acid oxidation to form Carbon dioxide and water. Calculate the number of ATP/s generated during the breakdown. (Show a stepwise calculation. Do not calculate the energy generated for one molecule and multiply by 6.) [8]

b What are checkpoints? What happens if you loose one of these checkpoints? Explain with example. [3]

Q3.a Justify why Arsenic has been used in pesticides to control the growth of insects. [2]

b. A plant is placed in carbon dioxide free environment and in bright light. How will the process of Photosynthesis be affected? Explain. [4]

Q4 a. Following is the sequence of double stranded DNA [10]

5'AGAATGCTAACCCGTAAATTAGGCATGTAAATTCTG 3'

3'TCTTACGATTGGGCATTTAAT CCGTACATTTAAGAC5'

(i) Write the RNA transcript for the sequence

(ii) Determine the order of the amino acids in the protein formed

(iii) A mutation occurred in the DNA such that the new DNA formed had the following sequence. Identify the type of mutation and suggest its implication on the cell.

5'AGA ATGCTAACCCGT AAATGAGGCATGTAAATTCTG 3'

3'TCT TACGAT TGGGCA TTTACTCCG TACATTTAAGAC5'

b. Although all the cells in your body carry the same genetic information, they do not perform the same activities. How is this possible? Justify the statement with suitable example and explain the mechanism underlying the statement. [4]

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

COURSE NO.: BIO F111

11.3.12

MAXIMUM MARKS: 50

COURSE TITLE: General Biology Weightage (25%)

DURATION: 50 Minutes

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

Q1a. How do control processes help in maintaining Homeostasis? Explain with an example [5]

b. How does spraying of pesticides persistently in the fields create reduction in the bird population? Explain with an example. [4]

c. The functionality of a protein depends on the structure of a protein .Explain with an example. [4]

Q2.a Other than storing energy how fat molecules are helpful to animals? [4]

b. How do fossils help in reconstructing evolutionary history of an organism? [4]

c List out the important functions of nucleic acids & carbohydrates [4]

Q3.a. List out the major differences between domains Eubacteria, Archaea [3]

b. Explain the mechanism by which the viruses cause disease .List out the points [4]

c. How do diffusion, facilitated diffusion, and active transport differ from each other? (List out the major differences in a tabular form only) [6]

Q4 a.Following are the components /organelle which are present in a cell: Chloroplast, Nucleoid, Nucleus ,Cell wall, Endoplasmic Reticulum , Centriole , Central vacuole , Contractile vacuole , Capsule , Nuclear envelope , Pili , 70S ribosomes ,80 S Ribosome .Using these components construct a plant cell ,an animal cell and Bacterial cell in a tabular form .(list out the components which are present in each cell type.) [9]

b. Mention the major function of Capsule, Endoplasmic Reticulum, Contractile vacuole, Cell wall (in different cell types) ,Centrioles & Lysosomes [3]

BITS Pilani – Dubai Campus

2nd Semester 2011- 2012

First Year (Sec 2, 4 & 6)
Date: 23/05/12 (Wed/7)
SET-A

General Biology (BIO F111)

Duration: 20 minutes

Quiz –2 (Closed book)

Weightage: 7% (Max Marks 14)

Id No: _____ Name: - _____ Sec: _____

Choose the correct answer(s)

- 1) During meiosis the resulting gametes have _____ the number of chromosomes as in the parent cell
a) double b) four c) half d) equal
- 2) Crossing over may occur during which phase of Meiosis I?
a) Prophase II b) Interphase c) Metaphase II d) none of the above
- 3) Cytokinesis occurs during which phase of Meiosis?
a) Prophase b) Telophase c) Interphase d) Metaphase
- 4) The Thompson seedless grape is triploid, with three copies of each chromosome. Which phase of the cell cycle would you expect triploid cells to be unable to complete.
a) meiosis I b) S c) meiosis -II d) G2
- 5) Coral in the ocean grows by budding, where the new organism grows out of the old one by mitosis. This form of replication is an example of:
a) meiosis to produce a zygote b) asexual reproduction c) sexual reproduction d) gamete formation
- 6) Two identical copies of a single chromosome that are connected by a centromere is referred as

(0.5x6=3.0)
- 7) Meiosis is a type of cell division that produces:
a) zygotes b) chromosomes c) DNA d) gametes
- 8) A human cell has 46 total or 23 pairs of chromosomes. Following mitosis, the daughter cells would each have a total of _____ chromosomes. After meiosis I, the two daughter cells would have _____ chromosomes, and after meiosis II _____ chromosomes.
- 9) During synapsis
a) sister chromatids pair along their length b) sister chromatid pair at the centromere
c) homologous repels each other d) homologous pair all along their length
- 10) Which one of the following statements is not true about meiosis?
a) Meiosis occurs in reproductive cells
b) In meiosis, chromosomes do not exchange genetic material
c) Meiosis results in four haploid daughter cells

d) In meiosis, homologous pairs of chromosomes are pulled apart

11) Gene for right handedness is dominant over the gene for left handedness .Most probable genotypes of the two right handed parents with left hand child is

- a) RR x rr b) rr x Rr c) RR x Rr d) Rr x Rr

12) A woman with type A blood group has a child with type A blood group. Which of the following men could not be the father of this child?

- a) A b) B c) AB d) all of the above e) none of the above

13) Free (Unattached) earlobes are a dominant trait. Ram and Geeta both have unattached earlobes but their daughter Seeta does not. If Ram and Geeta have a second child, what is the probability that it will have attached earlobes?

14) Some organisms are capable of asexual or sexual reproduction. Under favourable conditions, reproduction proceeds asexually. When conditions become more stressful reproduction switches to a sexual mode. Why?

- a) Sexual reproduction is simple and more rapid allowing larger numbers of offspring to be produced.
 b) Sexual reproduction requires two separate individuals, who can mutually provide nutrient support during stress.
 c) Asexual reproduction requires more energy.
 d) Sexual reproduction produces individuals with new combinations of recombined chromosomes increasing diversity.

15) Which of the following is unique to mitosis and not a part of meiosis?

- a) homologous chromosomes pair forming bivalents
 b) homologous chromosomes cross over
 c) chromatids are separated during anaphase
 d) homologous chromosomes behave independently

Define:

16) **Pleiotropy:**

17) **Codominance:**

(1x11=11)

BITS Pilani – Dubai Campus

2nd Semester 2011- 2012

First Year (Sec 2, 4 & 6)

General Biology (BIO F111)

Quiz –2 (Closed book)

Date: 23/05/12 (Wed/7)

Duration: 20 minutes

Weightage: 7% (Max Marks 14)

SET-B

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a) G₂ b) S c) meiosis -II d) meiosis I
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Define:

16) Pleiotropy:

17) Codominance:

(1x11=11)

BITS PILANI, DUBAI CAMPUS

DUBAI INTERNATIONAL ACADEMIC CITY, DUBAI, UAE
QUIZ - 1

GENERAL BIOLOGY BIO F111
04/04/2012
Time: 20 minutes

Max marks 16 (Weightage: 8%)

Name: Id No: Sec:

Under line the appropriate answer(s)

8 x ½ = 4 marks

- 1) The liver is located in the abdomen and performs many functions. Which of the following is NOT a function of the liver?
 - a) Storing food
 - b) Manufacturing insulin
 - c) Producing digestive juices
 - d) Healing itself when it is damaged
- 2) The least important human digestive organ from this list is the
Duodenum, esophagus, appendix, pancreas
- 3) The muscular contractions that occur all along the digestive tract and which move food along are called
Mastication, peristalsis, swallowing, micturition
- 4) When blood glucose drops, the _____ releases _____ which travels to the _____ causing _____ breakdown to release glucose into the bloodstream.
 - a) pancreas; insulin; muscles; protein
 - B) pancreas; glucagon; liver; glycogen
 - C) liver; insulin; pancreas; glycogen
 - D) liver; glucagon; pancreas; lipid
- 5) Tricuspid valve is located on
 - a) Right auriculo ventricular septum
 - b) Left auriculo ventricular septum
 - c) Inter auricular septum
 - d) Inter ventricular septum
- 6) When the aerobic cellular respiration's waste product, Co₂ is not eliminated, this results in
 - a) Lowering of P^H in the blood
 - b) Rising of P^H in the blood
 - c) Break down of glucose in the blood
 - d) Break down of ketones in the blood
- 7) The hormone which regulates the flow of urine is
 - a) Oxytocin
 - b) Renal hormone
 - c) Vasopressin
 - d) None of the above
- 8) The colon is primarily involved in the
 - a) Process of emulsification
 - b) Reabsorbing of water
 - c) Breakdown of cellulose
 - d) Maintain the ionic balance

Fill in the blanks with precise answer.

10 x ½ = 5 marks

- 9) A typical pressure recorded while the heart is relaxing is referred as blood pressure and it is measured as
- 10) Mention the types of Agranulocytes &

11) When red blood cells become old or damaged, they are broken down in the body, resulting in a yellow pigmented chemical called as

14) The two muscles involved in breathing movements are &

15) The semi liquid mass of partially digested food, chyme from the stomach enters into the small intestine through the valve referred as

16) The bronchioles deliver air to the clusters of tiny air sacs - called as

17) Name the 3 salivary glands in human being

18) The valves present in the aorta and pulmonary artery are

Write short notes on the following:

3 x 1 = 3 marks

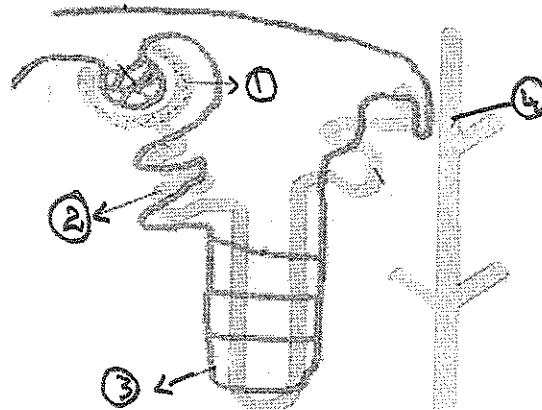
19) Varicose veins

20) Emphysema

21) Emulsification

22) Identify the regions given in the diagram and mention its main functions

4 x 1 = 4marks



No	Name of the region	Function
1		
2		
3		
4		

'All the best'