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Sardar Patel University
Third semester examination-2013
Subject-Bioinformatics (Title—Cell Biology and Genetics)
Course-US03CBNF05 (3 credit course)

Time: 2.30pm -5.30pm

Date: 21/11/2013--Thursday

Total Marks-70

Multiple choice questions

[10]

- i) Biological membranes are normally permeable to:
A. large, hydrophilic molecules.
B. small, hydrophilic molecules.
C. large, hydrophobic molecules.
D. small, hydrophobic molecules
- ii) In a lipid bilayer, _____ fatty acid tails face each other within the bilayer and form a region that excludes water.
A. hypertonic B. hypotonic C. hydrophilic D. hydrophobic
- iii) What is meant by the term "fluid mosaic model"?
A. It is the diffusion of lipid-soluble substances through the lipid bilayer.
B. It is the movement of lipids and integral proteins within the lipid bilayer.
C. It is the solubility of water in the membrane.
D. It is the method of substance transport across the membrane
- iv) Which of the following correctly matches an organelle with its function?
A. Mitochondrion . . . photosynthesis B. Nucleus . . . cellular respiration
C. Lysosome . . . movement D. Central vacuole . . . storage
- v) A dihybrid cross F₂ ratio of 15:1 is due to
A. Duplicate gene C. Dominance epistasis
B. Recessive epistasis D. Supplementary gene
- vi) Among the followings which one is single membrane organelle
A Chloroplast B Nucleus
C Lysosome D Mitochondria
- vii) Pleiotropy is:
A When a single locus affects many different traits.
B When the X chromosome is inactivated in some tissues, but not others
C When one gene locus affects the expression of others
D The inheritance pattern exhibited when a gene is carried on sex chromosome
- viii) Crossing over takes place at a stage known as
A. Interphase B. Zygotene C. Pachytene D. Telophase
- xi) If the mother is a carrier for hemophilia (an X-linked disease) and the father has hemophilia, what is the probability of disease in their children ?
A 0% B 25% C 50% D 100%
- x) The ratio 1:1:1:1 is expected in
A. Monohybrid cross C. Back cross
B. Test cross D. Dihybrid cross

Conti...

- Q2. Short questions. Attempt any 10 out of 12 questions.(2mark each) [20]**
- i. Define membrane fluidity.
 - ii. Explain the structure of phospholipids in membrane.
 - iii. Enlist the types lipids in plasma membrane.
 - iv. Enlist the reasons for selecting pea plant by Mendel.
 - v. What is law of incomplete dominance?
 - vi. Draw the diagram of any membrane bound organelle
 - vii. Give the functions of Centriole.
 - viii. Define linkage and epistasis.
 - ix. What is cytoplasmic inheritance?
 - x. What is the significance of crossing over?
 - xi. Give the functions of mitochondria.
 - xii. Mention the possible gametes for a dihybrid RrWw.
- Q3. What are the various components of plasma membrane. Explain in detail about the membrane proteins and their functions. [10]**
- OR**
- Q3a. Explain unit membrane concept. [04]**
- Q3b. Discuss various functions of plasma membrane. [04]**
- Q4. Draw the labeled structure of nucleus and golgi body and give their functions. [10]**
- OR**
- Q4. Discuss the structure and functions of mitochondria and lysosome. [10]**
- Q5. What are the laws of inheritance? Explain in detail the law of segregation with an example. [10]**
- OR**
- Q5a. In dogs, brown colour coat is dominant to albino and short hair is dominant to long. If these are governed by two independently segregating gene pairs B,b and S, s; find genotypes and phenotypes of progeny in following cross. BbSs X BbSs. [04]**
- Q5b. A man with dark (dominant), curly hair marries a woman with light, straight hair. Their daughter, who happens to have dark hair, marries a man with light, wavy hair. Answer the following questions about this dark-haired daughter and her family [04]**
- (i) Draw a Punnett's square for this marriage, and predict the phenotypic ratio among the offspring of the daughter and her husband.
 - (ii). What is the chance that they will have a child with hair just like his or her father's? justify your answer.
- Q6. (a) What is the difference between linkage and crossing over? [05]**
- (b) What is penetrance? Discuss its different forms. [05]**
- OR**
- Q6. Define and explain the terms supplementary genes, complementary genes and lethal genes with an example of each. [10]**