

Enrollment ID: _____

NAVRACHANA UNIVERSITY
School of Liberal studies and Education
(B.Sc. Program)
End Semester Examination November 2017
SY-B.Sc 3rd Semester

Course Title: Cell Biology (BC 201)

Marks: 40

Date: 20/11/2017

Time: 3:30 pm to 5:30 pm

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Important Instructions

1. All the Questions are Compulsory
2. Please read the questions carefully and answer accordingly
3. Draw a neat and labeled diagram wherever necessary

Q1. Choose the correct option

(1 × 10 = 10 M)

1. Which of the following is NOT a characteristic of a prokaryotic cell?
A semi-fluid region consisting of cytosol
a. Membrane-bound cellular organelles
b. Plasma membrane consisting of lipids and proteins
c. Ribosomes that synthesize proteins
d. Ribosomes that synthesize proteins
2. In cells, which of the following can catalyze reactions involving hydrogen peroxide, provide cellular energy, and make proteins, in that order?
a. Peroxisomes, mitochondria, and ribosomes
b. Peroxisomes, mitochondria, and lysosomes
c. Peroxisomes, mitochondria, and Golgi apparatus
d. Lysosomes, chloroplasts, and ribosomes
3. Prokaryotic and eukaryotic cells generally have which of the following features in common?
a. A membrane-bound nucleus
b. A cell wall made of cellulose
c. Ribosomes
d. Similar size and complexity
4. The exchange of segments of chromatids during synapsis is known as
a. cross linkage
b. gene linkage
c. sex linkage
d. crossing over
5. Chemical analysis indicates that the cell membrane is composed mainly of
a. proteins and starch
b. proteins and cellulose
c. lipids and starch
d. lipids and proteins
6. All of the following organelles are associated with protein synthesis EXCEPT:
a. Golgi bodies
b. the nucleus
c. the rough endoplasmic reticulum
d. the smooth endoplasmic reticulum
7. Which of the following best corresponds to vesicles that serve to break down cellular debris?
a. Smooth ER

- b. Lysosome
- c. Cell wall
- d. Plastids.

8. You are examining the effects of mutations on a nuclear pore. In which of the following cases will nuclear proteins still be able to enter the (include those where function will be impaired, but still able to occur):

- a. The nuclear localization signal is mutated on a nuclear protein.
- b. The nuclear transport receptor cannot bind to the nuclear protein.
- c. A limited amount of kinase is available in the cell to hydrolyze the GTP.
- d. Nuclear transport proteins pass through with nuclear proteins but cannot be recycled to the cytosolic side of the cell.
- e. The nuclear protein is unable to unfold.

9. The varied forms and functions of actin filaments in cells depend on multiple actin binding proteins. These are involved in:

- a. polymerization of actin filaments.
- b. cross-linking the filaments into loose networks.
- c. making stiff bundles of actin and attaching them to membranes.
- d. moving actin filaments relative to one another.

10. Which of the following occur in the ER lumen?

- a. proteins fold.
- b. proteins assemble with other proteins.
- c. proteins form disulfide bonds.
- d. proteins become "decorated" with oligosaccharide chains.

Q2.(A) Do as directed:

(1 × 3= 3M)

- 1. Transport vesicles occasionally bud from the *trans* Golgi network to fuse with the plasma membrane in a process called constitutive exocytosis. (T/F)
- 2. Most components of the endocytic vesicle membrane eventually are returned to the plasma membrane for reuse. (T/F)
- 3. Nucleus helps organelles maintain their position in the cytosol(T/F)

Q 2 (B) Match the following organelles with their function: (Give as many functions that match)

(1 × 3= 3M)

a. Mitochondria	_____	quality control of mRNA
b. Endoplasmic reticulum	_____	location of oxidative phosphorylation
c. Nucleus	_____	responsible for detoxifying organic molecules (liver cells)
d. Lysosome	_____	houses and protects genetic material
e. Endosome	_____	responsible for modification and sorting of proteins and lipids
f. Golgi apparatus	_____	location of ATP synthesis
	_____	responsible for sorting endocytosed materials
	_____	site of degradation and digestion
	_____	responsible for oxidizing toxic molecules
	_____	location of lipid synthesis
	_____	location of hormone synthesis (adrenal cells)

Q4. Define the following

(1×4= 4 M)

- 1. Diffusion and Osmosis
- 2. Tight junctions.
- 3. Intermediate filaments
- 4. Centrosome

Q5. Answer the following questions in short (3 × 2 = 6 M)

1. Briefly explain the difference between membrane-bound and free ribosome.
2. Describe the sequence of events of the secretory pathway that proteins undergo, from the time they are made and modified in the ER until they reach the plasma membrane.
3. Describe the structure of Endoplasmic reticulum in brief.

Q6. Write a short note (Any 1) (1 × 3 = 3 M)

1. Structure function and location of microtubules
2. Structure of nucleus.

Q7. Answer the following questions in detail (Any 3) (3 × 3 = 9M)

1. List the components of the cytoskeleton and briefly discuss their properties.
2. Describe the structure of cilia and flagella discuss its mechanism of movement.
3. What are the salient features of Eukaryotic cell membrane? Explain with a suitable diagram.
4. What is the methodology adopted for performing paper chromatography in your lab? Give details of its principle, working, requirements and points to be taken care.

Q8. (1 × 2 = 2M)

Suppose there were a genetic defect in the genes that code for kinesins and dyneins. What would happen within the cell? Why?

OR

Design an experiment to determine whether or not a protein bears a particular signal sequence.

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