Set 2

(1)

32047

UNIVERSITY OF MUMBAI

Sem – IV (CBCSG) Examination April, 2018

Class: SYBSc. Course: IX Course Marks: 100

Code: USZO 402 (**Cell Biology, Endomembrane System and Biomolecules**) Time : 03 Hrs

MODEL ANSWER KEY

Q.1 A) Fill in the blanks by choosing the correct options given below **05**

a) Anton van Leeuwenhoek described a live animal cell.

b) Mitochondria are called power houses of cell.

c) TGN region is found in Golgi complex.

d) Glycosidic bond is a covalent linkage that links glycosides.

e) The disease scurvy is caused due to deficiency of Vitamin C.

B) Match the columns I and II and rewrite **05**

Column I	Column II
a) Nucleolus	**i.** Fontana
b) Lysosomes	**ii.** Christian de Duve
c) Mitochondria	**iii.** Benda
d) Peptide bond	**Iv** Joins two amino acids
e) Ester Linkage	**v.** Leopold Gmelin

C) State whether True or False

a) In prokaryotic cell nucleus is absent - True 01

b) A typical mammalian nucleus has about 300 to 400 pores - False 01

c) Microtubules are discovered by De Robertis and Franchi in 1935 - True 01

d) Peptide bond is found in lipids - False 01

e) The disease rickets is caused due to deficiency of vitamin D - True 01

***D)* Define the following.**

a) Plasma membrane – The plasma membrane is a biological membrane which works as a barrier between the inner and outer surface of a cell. 01

b) Osmosis - Osmosis is the diffusion of water or solvent across a semi permeable membrane from a region of its high concentration to that of low concentration 01

c) Zone of exclusion – The Golgi complex is usually surrounded by a differentiated region of cytoplasm which is called zone of exclusion. 01

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d) Biomolecules – These are the molecules that naturally occur in living organisms which are responsible for their growth, maintenance and metabolic processes. 01

e) Lipids – Lipids are heterogenous group of oily or greasy organic compounds. 01

Q.2 A) Describe the generalized structure of prokaryotic and eukaryotic cell.

1. Introduction and definition of cell. 01
2. Description with respect to- 05
   a) Size b) Genetic information c) Nucleus d) Cell division
   e) Internal membranes f) Ribosomes g) Cytoskeleton
   h) Exocytosis & Endocytosis i) Motility j) First appeared etc.
3. Diagram 04

OR

A) Describe diffusion and osmosis.

1. Introduction
2. Osmosis 03
   - Definition
   - Osmolarity
   - Hypertonic solution
   - Hypotonic solution
   - Isotonic solution
   - Diagram 02
3. Diffusion 04
   - Simple diffusion
   - Solute size
   - Solute polarity
   - Ion permeability
   - Diagram 01

B) Explain any two from the following.

a) Cell theory

1. introduction
2. Contribution of 05
   - Robert Hooke
   - Anton van Leeuwenhoek
   - Matthias Schleiden
   - Theodone Schawnn
   - Rudolf Virchow

b) Ultrastructure of nuclear membrane and pore complex.

1. Introduction

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2. Description- 03
- Perinuclear space
- Nucleopore comples
- Nuclear membrane
- Nuclear pore complex
- Diagram 02

c) General structure of plasma membrane.
1. Significance of plasma membrane 01
2. Composition of plasma membrane 02
3. Diagram 02

d) Functions of microfilaments.
1. Introduction
2. Any Five functions 05

Q.3 A) Give an account on occurrence functions of lysosomes. 10
1. Occurrence 03
2. Functions 07

OR

A) Give an account on Kreb's cycle
1. Introduction
2. Steps of Krebs's cycle 06
- Condensation
- Dehydration - I
- Hydration - I
- Oxidation - I
- Decarboxylation - I
- Oxidation II & Decarboxylation II
- Substrate level formation of ATP
- Oxidation - III
- Hydration - II
- Oxidation - IV
3. Diagram 04

B) Explain any two from the following.

a) Ultrastructure of endoplasmic reticulum
1. Introduction (Dimensions, Composition etc) 01
2. Elements: 04
- Sarcoplasmic reticulum
- Ergastoplasm
- Myeloid bodies and ER paranuclei

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b) Occurrence and morphology of mitochondria.

1. Introduction
2. Description: Size, Shape etc — 03
3. Diagram — 02

c) Types of lysosomes

1. Introduction
1. Four Types of lysosomes — 05
   - i. Primary lysosomes or storage granules
   - ii. Digestive vacuoles or heterophagosomes
   - iii. Residual bodies
   - iv. Autophagosomes or Cytolysosomes

d) Biogenesis of mitochondria.

1. Theories of mitochondrial formation — 03
   - Formation of mitochondria from intracellular strucures.
   - *De novo* formation from simpler building blocks
2. Diagram of biogenesis — 02

Q.4 A) Discuss the concept of micromolecules and macromolecules. Add a note on functions of macromolecules.

1. Introduction & definition of cell. — 01
2. Description with respect to- — 05
   a) Size b) Genetic information c) Nucleus d) Cell division
   e) Internal membranes f) Ribosomes g) Cytoskeleton
   h) Exocytosis & Endocytosis i) Motility j) First appeared etc
3. Diagram — 04

OR

A) Discuss the classification of fatty acids.

1. Introduction — 01
2. Depending upon the length of nonpolar hydrocarbon chain — 02
   - Short chain
   - Medium chain
   - Long chain
3. Depending on presence and absence of one or more double bonds between carbon atoms: — 05
   - Saturated acidsand
   - Unsaturated fatty acids
4. Examples — 02

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B) Explain any two from the following. 10

a) Properties of Carbohydrates.

1. Introduction
2. Five properties 05

b) Basic and typical structure of amino acids.

1. Description of amino acid 03
2. Diagram – Deriving the structure of amino acid 01
3. Structure of typical amino acid 01

c) Ester linkage.

1. Introduction
2. Description 03
3. Formation of Ester linkage 02

d) Deficiency and clinical significance of Vitamin D.

1. Clinical significance 03
2. Deficiency of Vitamin D 02

d) Deficiency and clinical significance of Vitamin D.

Q.5 Write short notes on any four

a) Ultrastructure of nucleus.

1. Introduction
2. Structure: Nuclear envelope, Nuclear pore, Chromatin. Nucleolus 03
3. Diagram 02

b) Simple diffusion.

1. introduction
2. Description 03
   - Solute size
   - Solute polarity
   - Ion permeability
3. Diagram 02

c) Occurrence of endoplasmic reticulum

1. Introduction 01
2. Description: 04
   - Cisternae
   - Tubules
   - Vesicles

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d) Glycosidic bond

1. Introduction
2. Description 03
3. Formation of glycosidic bond 02

e) Clinical significance and causes of deficiency of Vitamin B_{12}.

1. Clinical significance 01
2. Causes of deficiency of Vitamin B_{12} 04

f) Functions and deficiency manifestation of Vit. A

1. Introduction
2. Functions 02
3. Deficiency manifestation 03