



INDIAN INSTITUTE OF TECHNOLOGY PATNA

B.Tech. (First Year: CSE, ME)

Combined-Semester Examination (CSE)

Even Semester - 2016-17

Biology- CB102

Full Marks: 80

Time: 2 Hours 30 Min

Date: 24/04/2017

Please answer precisely.

- 1) Indicate True or False for the following statements: [10X1=10]
- Cell that can give rise to any type of cells is known as stem cell.
 - Coding areas of the genes are known as introns.
 - Heritable changes in the DNA sequence is known as mutations.
 - t-RNA are responsible for bringing the respective amino acids to correct codon during protein synthesis.
 - Bioinformatics is the science that deals with biological databases and analysis of DNA and protein sequences.
 - Repressor is a protein that binds to operator.
 - There are 23 amino acids which make all proteins.
 - Promoter is the sequence of DNA at which RNA polymerase binds and starts transcription.
 - Ribosome is the site for protein synthesis.
 - The structure of RNA is like a double helix.
- 2) Write short notes on ANY SIX of the following terms: [6X2=12]
GFP, System Biology, Signal transduction, Second messenger, Stop codon, BAT BOT, Genetic Circuits.
- 3) Differentiate between ANY TWO pairs: [2X4=8]
- Prokaryote and eukaryote
 - Transcription and translation
 - DNA and RNA

Answer ANY TWO questions from 4 to 6.

[2X5=10]

- What is the importance of Hersey and Chase experiment?
- What are the applications of engineering in human health?
- Write about different types of receptors.

7) Indicate True or False for following statements.

[10X1=10]

- The major functions of lysosomes inside the cells are to break down food, waste & damaged cell parts known as autophagy.

- b. The major functions of endoplasmic reticulum is to break down toxins such as drugs/alcohols and proteins folding, disulfide bond formation and glycosylations
- c. Mitochondrion is bean shaped structure which is known as power house of the cells.
- d. Glucose is transported by Facilitated diffusion is active transport which utilized energy.
- e. Plant cells contain central vacuole only but it is missing centrioles.
- f. Ribosomes (80S) is present in prokaryotes
- g. Endosymbiotic theory is supporting evidence included organelles with their own DNA
- h. Peroxisomes help in break-down fatty acids and toxic compounds including biogenesis of cholesterol and bile salts
- i. Cell membrane and DNA are present in both prokaryotes and eukaryotes cells
- j. Nucleolus is also present in bacteria which helps in RNA biosynthesis

8) Write short note on any of 8 questions

[8X1=8]

Chromoplast and chloroplast, endocytosis & exocytosis, anabolism and catabolism, glyconeogenesis, Transamination reactions, anaerobic metabolism, Nucleus, Endoplasmic reticulum, Cell wall

9) Write four to six sentences any of 4 questions

[4X1.5=6]

- a. What is difference between active and passive membrane transport?
- b. What are major roles of cholesterol in the plasma membrane structure and function?
- c. Describe the structure and function of ATP in energy metabolism
- d. Describe differences between glycolysis and glycogenesis
- e. Describe the difference between lysosomes and peroxisomes functions

10) Answer ANY Four questions

[4X2.0=8]

- a. Define protein structures and quaternary structure of proteins.
- b. How glucose oxidized/metabolized in bacteria and gets energy?
- c. Describe briefly lipid metabolism.
- d. How alcohol metabolism differs from glucose metabolism?
- e. What are long term effects of alcohol consumption on human health?

Answer ANY Two questions from 11 to 13.

[2X4=8]

- 11) What are the major factors which affects enzymatic activity of an enzyme? How enzyme structures influence enzymatic activity?**
- 12) Describe in details fluid mosaic model of membrane with structure and its functions?**
- 13) Explain in details carbohydrates metabolism (glycolysis, TCA cycle) and how many ATP molecules gained after complete oxidation of one glucose molecule?**
