BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: B.E.
BRANCH: ALL

SUBJECT: BT3021 BIOLOGICAL SCIENCES

SEMESTER : III
SESSION : MO/2014

TIME: 3 HOURS

FULL MARKS: 60

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Steam Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Write the Taxonomic ranks used to classify organisms. [2]
(b) Discuss Miller's experiment and its significances. [4]
(c) Discuss the scientific theories about origin of life. [6]

Q.2(a) What is nucleic acid? [2]
(b) Define lipids. Discuss the structural and functional role of lipid biomolecule. [4]
(c) Write short notes on any three: [4x3]
(i) Carbohydrate (ii) Vitamins (iii) Minerals (iv) Protein

Q.3(a) What is the difference between aerobic and anaerobic respiration? [2]
(b) Discuss the different steps of Kreb's cycle? How many ATPs are formed when one glucose molecules is oxidized to CO_2, aerobically? [4]
(c) Discuss β-oxidation of linear fatty acids having 18 carbons with no double bond. [6]

Q.4(a) What is virus? [2]
(b) Give an account on various organelles present in Plant cell. [4]
(c) Explain the different stages of mitotic cell cycle? Give the differences between mitosis and meiosis. [6]

Q.5(a) Define Replication, Transcription and Translation. [2]
(b) Provide the double helix structure of DNA with suitable diagram. [4]
(c) Explain the structure of a gene. How RNA is formed from DNA? Provide the mechanism. [6]

Q.6(a) What are the roles of enzymes in biological system? [2]
(b) Discuss the various models explaining how enzymes work. [4]
(c) Discuss the competitive and Non-competitive enzyme inhibitors. [6]

Q.7(a) What is Chromatography? [2]
(b) Give the principle of gel electrophoresis. Explain any gel electrophoresis technique used for DNA isolation. [4]
(c) Write short notes on: [4x3]
(i) Centrifugation (ii) Thermal Analysis (iii) HPLC