

Bhakta Kavi Narsinh Mehta University, Junagadh



B.Sc. BIOTECHNOLOGY

(SEMESTER I)

On Effective - 2018

BIOTECHNOLOGY SEMESTER - I

PAPER 1- INTRODUCTION TO BIOTECHNOLOGY AND CELL BIOLOGY

Unit-1:- INTRODUCTION AND SCOPE OF BIOTECHNOLOGY

- 1.1 Historical perspective and Definitions of Biotechnology
- 1.2 Current Status of Biotechnology and Future of Biotechnology in Developing World.
- 1.3 Recombinant DNA Technology
- 1.4 Applications of Biotechnology- Agriculture, Medicine & Environment
- 1.5 Ethical and Social Impacts

UNIT-2:- BASIC CONCEPT AND UNDERSTANDING OF CELL

- 2.1 Concept of Life, Origin and Evolution of Cell and Cell Theory
- 2.2 Cell Structure (organization of plant and animal cell, chemical composition of cell, comparison of plant, animal and prokaryotic cell)
- 2.3 Diversity of Cell Size and Shape
- 2.4 Ultrastructure and Function of Prokaryotic cell and Virus
- 2.5 Microscopic Techniques for Study of Cell

UNIT-3:- STRUCTURE AND FUNCTION OF CELL ORGANELLES

- 3.1 Cell Wall and Plasma Membrane
- 3.2 Mitochondria and Chloroplast
- 3.3 Endoplasmic Reticulum and Golgi Bodies
- 3.4 Lysosomes, Glyoxisomes and Peroxisomes
- 3.5 Ribosomes

UNIT-4:- NUCLEUS, CELL CYCLE AND CELL DIVISION

- 4.1 Nucleus
- 4.2 Structure and Ultrastructure of chromosomes
- 4.3 overview of cell cycle
- 4.4 Mitosis and Meiosis
- 4.5 Regulation of cell cycle

UNIT-5:- ADVANCE STUDIES IN CELL BIOLOGY

- 5.1 Cytoskeleton
- 5.2 Cell Locomotion – Amoeboid, Flagella, Cilia, Cytoplasmic Streaming
- 5.3 Cell – Cell Interaction
- 5.4 Overview of Stem cells
- 5.5 Cancer biology

LIST OF PRACTICALS

- Exp.1. Introduction to LAB and lab environment
- Exp.2. Preparation of solution
- Exp.3. Staining techniques (Simple and Differential)
- Exp.4. Calibration of stage and ocular micrometer and measurement of given biological samples
- Exp.5. Cytology and histology of various organs (Permanent slides or fresh preparation)
- Exp.6. Preparation of slides showing different stages of cell division – Mitosis and meiosis
- Exp.7. Human Karyotyping
- Exp.8. Preparation of slide of Polytene and Lampbrush chromosomes from drosophila Larvae
- Exp.9. Isolation of chloroplast and microscopic observation
- Exp.10. Observation of bacterial motility by performing hanging drop method
- Exp.11. One day Field visit

LIST OF REFERENCES

- 1. Alberts. Molecular Biology of cell. Garland Pub.
- 2. Verma, Cell biology ,Genetics ,Molecular Biology, Evolution & Ecology.2006
- 3. Lodish, Cell & Molecular Biology, W.H. Freeman. 5th Edn.
- 4. C.B. Powar, Cell Biology, Himalaya Press.
- 5. Nelson & Cox, Lehninger Principle Biochemistry, Freeman Pub.
- 6. Geoffrey Cooper, The Cell Molecular Approach, ASM Pub.
- 7. De Robertis, Cell Biology
- 8. Biotechnology, B.D. Singh
- 9. Practical manuals of biotechnology, S. chand
- 10. Cytogenetics, P.K. Gupta, Rastogi Pub.
- 11. Basic Biotechnology, Prave Fanst, Sitting & Sukatsch, Panima Pub.
- 12. Biotechnology & Genomics, P.K. Gupta, Rastogi Pub.
- 13. Biotechnology, U. Satyanarayan, Books and Allied
- 14. Cell & Molecular Biology, P.K. Gupta, Rastogi Pub.
- 15. Albert, Essential Cell Biology, Garland Science.
- 16. Becker. 1996. Biotechnology: A laboratory course. Alp
- 17. Glick, Molecular Biotechnology, ASM Publication.
- 18. Karp, Cell & Molecular Biology: concepts & Experiments. 4th Edition.
- 19. Becker & Hardin, The world of the Cell, Pearson Pub.
- 20. Desiker, Cell & Development Biology, Dominant Pub.
- 21. BioInquiry- making connections in Biology, Nancy L. Pruitt, William Surver, John Wiley & Sons

22. Explore Life, Postlethwait J.H., & Hopson J.H., Thomson book Pub.
23. Essential Biology (3rd Edition), Campbell, Reece & Simon,
24. Biotechnology Fundamental & application, S.S.Purohit, Agrobios
25. Analyzing Chromosome, B. Czepulkowski, BIOS Scientific Publishers Ltd
26. Biotechnology, Demystifying the concepts. By David Bourgaize. Alp 2000
27. Introduction to Biotechnology, Brown Campbell priest, Panima Pub. Cell Biology, Sadava, Panima Pub.

PAPER STYLE FOR SEMESTER 1

- General Instructions

1. B.Sc. Bio-Technology Syllabus for semester 1 and 2 consists of 5 units,
2. All units carry 14 marks.
3. 70 marks for theory and 30 marks for internal examinations.
4. Total 5 questions one question from each unit.
5. Each question of 14 mark
6. Time duration: $2\frac{1}{2}$ hours.

Question:1 from Unit 1 : Mark 14

Question:2 from Unit 2 : Mark 14

Question:3 from Unit 3 : Mark 14

Question:4 from Unit 4 : Mark 14

Question:5 from Unit 5: Mark 14

Each question divide in a, b and c sub question as shown below.

- (a) Answer the following (any one out of two) [07 Marks]
(Theory question)
- (b) Attempt any one (out of two) [04 Marks]
(Application / Example / Problem / Theory)
- (c) Attempt any three (out of five) [03 Marks]
(Short answer / one word / one line / true of false / fill up the blanks)