Exam.Code:5011
Sub. Code: 11743

2124

Bachelor of Science (FYUP) First Semester

Biotechnology

BTEM1: Fundamentals of Biotechnology I

Time allowed: 3 Hours Max. Marks: 68

NOTE: Attempt <u>five</u> questions in all, including Question No. 1 which is compulsory and selecting one question from each Unit.

x-x-x

I. Attempt the following:-

a) Define Biotechnology, mention its role in medical care.

b) What are model organisms? Name commonly used model organisms in biotechnology research.

c) Explain Blue Biotechnology.

d) Draw structure of prokaryotic cell.

e) Write down Principle of Electrophoresis.

f) What is the application of transgenic plants in Biotechnology?

g) Write down achievement of private sector of Biotechnology in India.

h) Define Genetic Engineering by giving suitable example. (8x2)

UNIT - I

II. a) Mention any two fields of biotechnology where it has significant applications.

b) Why is *E. coli* considered an ideal model organism in molecular biology? (7,6)

III. a) Briefly describe how biotechnology contributes to environmental sustainability.

b) How are viruses used as vectors in gene therapy? (7,6)

UNIT - II

IV. a) Define Cell. Who discovered Cell? Draw well labelled structure of Animal Cell.

b) Compare and contrast prokaryotic and eukaryotic cells based on their structure, size, genetic material, and organelles? (6,7)

P.T.O.

V. a) Explain the differences between somatic cells and germ cells in terms of structure, function, and division?

b) Define cellular specialization. Provide examples of specialized cells in humans and explain how their structure relates to their function? (6,7)

UNIT - III

VI. a) Explain the methods of sterilization used in laboratories. Compare physical and chemical sterilization techniques with suitable examples.

b) Explain the principle of chromatography. Differentiate between thin-layer chromatography (TLC) and high-performance liquid chromatography (HPLC). (6,7)

VII. a) Discuss the importance of biosafety management in biotechnology. Highlight the role of guidelines and regulations in ensuring responsible practices.

b) What are patents? Explain their significance in biotechnology, emphasizing the process of obtaining a patent and the ethical considerations involved. (6,7)

UNIT - IV

VIII. a) Define genetically modified organisms (GMOs). Discuss their production process and highlight their applications in agriculture and healthcare.

b) Explain the potential risks and public concerns related to genetic engineering. Address the ethical, environmental, and health-related challenges. (6,7)

IX. a) Explain the concept of transgenic animals. Discuss their role in biomedical research, agriculture, and pharmaceutical production with examples.

b) Discuss the scope and advancements in biotechnology research in India. Highlight key areas of focus and the government's role in promoting this field. (6,7)

x-x-x