

BLDE (DEEMED TO BE UNIVERSITY)
Master of Science in Microbiology / Biotechnology

[Time: 3 Hours]

[Max. Marks: 80]

IV SEMESTER

PAPER – I (Medical Biotechnology / Medical Microbiology)

QP CODE: 7641/7841

Your answer should be specific to the questions asked.

Write Question No. in left side of margin.

Long Question (Any – 3)

10 X 3= 30 Marks

1. Explain the principle, components, methodology and applications of PCR in molecular diagnosis, with its advantages and limitations.
2. Evaluate gene therapy applications in cardiovascular diseases and cancer, and discuss the role of humanized antibodies and plasminogen-activating factor in thrombosis treatment.
3. Critically evaluate the applications of human genomic information in healthcare, prenatal diagnosis and genetic manipulation, with emphasis on their ethical, social and legal implications
4. Discuss the scientific, ethical and social implications of animal cloning, human cloning, organ transplantation and xenotransplantation along with their benefits and risks.

Short Essays: (Any – 7)

5 X 7 = 35 Marks

5. Explain the different types and sources of stem cells, compare their properties and differentiation potential.
6. Describe the mode of infection, clinical manifestations and epidemiology of tuberculosis and anthrax, with their prevention and control measures.
7. Describe the principle of fluorescence immunoassay and discuss its diagnostic applications.
8. Describe the roles of oncogenes and tumor suppressor genes in cancer development.
9. Compare chemotherapy, radiotherapy and immunotherapy with respect to their principles, mechanisms and applications in cancer treatment.
10. Describe the molecular approaches used for the pre-symptomatic detection of genetic diseases
11. Discuss the properties and therapeutic potential of embryonic stem cells and evaluate their applications in tissue repair
12. Describe the mode of infection, symptoms and control measures of gonorrhoea and tuberculosis.

Short Answers: (Any – 5)

3 X 5 = 15 Marks

13. Define medical biotechnology and list any two areas of its application in healthcare.
14. Differentiate between RIA and fluorescence immunoassay with one application of each technique.
15. Define oncogenes and tumor suppressor genes and state one function of each.
16. Differentiate between viral and non-viral vectors used in gene therapy along with their advantages
17. Define induced pluripotent stem cells (iPSCs) and mention any two applications of iPSCs in regenerative medicine.
18. Define the mode of infection and state the major symptoms of HIV infection.

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IV SEMESTER

PAPER – II (Microbial Biotechnology/ Industrial Biotechnology)

QP CODE: 7642/7842

Your answer should be specific to the questions asked.

Write Question No. in left side of margin.

Long Question (Any – 3)

10 X 3 = 30 Marks

1. Explain the principles of microbial strain improvement. Discuss isolation, selection, enrichment, and screening methods used to obtain industrially important microorganisms.
2. Describe types of bioreactors. Explain aeration, agitation, oxygen transfer, critical oxygen concentration and determination of K_La .
3. Explain in detail the fermentation process and its types with suitable examples
4. Describe the industrial production of penicillin. Explain the fermentation process, major process parameters and downstream processing involved.

Short Essays: (Any – 7)

5 X 7 = 35 Marks

5. Explain process development and optimisation and its types.
6. Explain immobilization techniques and applications.
7. Describe the role of precursors, metabolic regulators, buffers and oxygen requirements in industrial fermentation media.
8. Explain any three specialized bioreactors: packed bed, fluidized bed, cyclone and trickle flow reactors.
9. Describe biomass separation by centrifugation, filtration and flocculation.
10. Explain solvent extraction and two-phase extraction used in downstream processing.
11. Write an account of chromatography, ultrafiltration, reverse osmosis and crystallization in product purification.
12. Describe the industrial production of ethanol and mention important factors affecting alcoholic fermentation.

Short Answers: (Any – 5)

3 X 5 = 15 Marks

13. Define industrial fermentation.
14. What is primary screening? Give one example.
15. What is enrichment culture?
16. Define critical oxygen concentration.
17. What is K_La ?
18. Mention any three process variables monitored during fermentation.

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IV SEMESTER
PAPER – III (Environmental Science)
QP CODE: 7643/7843

Your answer should be specific to the questions asked.

Write Question No. in left side of margin.

Long Question (Any – 3)

10 X 3 = 30 Marks

1. Discuss water pollution – sources, types, and control measures with examples of water-borne diseases.
2. Describe methods of solid and liquid waste characterization and their significance in waste management.
3. Explain the principles of bioremediation with special reference to xenobiotics degradation.
4. Write about Soil pollution – sources and characteristics of soil pollutants.

Short Essays: (Any – 7)

5 X 7 = 35 Marks

5. Role of rhizosphere microbes in soil fertility.
6. Biological and technological indicators of water pollution.
7. Activated sludge process in wastewater treatment.
8. Brief account on phyllosphere and spermosphere.
9. Bio-mining and its importance.
10. Effects of ozone depletion on human health.
11. Bio-deterioration of leather and paper.
12. Composting – process and microbial involvement.

Short Answers: (Any – 5)

3 X 5 = 15 Marks

13. Define amensalism with an example.
14. Mention two health hazards of air pollution.
15. Write names of two enzymes important for nutrient release in soil.
16. What are trickling filters?
17. Mention any two applications of bio-leaching.
18. Explain Greenhouse effect.