



Name :

Roll No. :

Invigilator's Signature :

**CS/MBT/SEM-3/MBT-303/2009-10
2009**

**IPR, BIOETHICS & ENVIRONMENTAL
BIOTECHNOLOGY**

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

**GROUP – A
(Objective Type Questions)**

1. Answer any *ten* questions : 10 × 1 = 10
- i) What can be protected as trademark ?
 - ii) What could be protected under design registration ?
 - iii) What could be protected under copyright ?
 - iv) What could be protected as service mark ?
 - v) Who coined the term Bioethics ?
 - vi) Where was the term Bioethics first coined ?
 - vii) What is the contribution of TL Beauchamp and JF Childress in the field of Bioethics ?
 - viii) What was the role of Casper Weinberger in connection to Bioethics ?
 - ix) Which organism causes the disease “Giardia intestinalis” ?
 - x) Draw structures of ortho and para forms of Catechol.



- xi) What is the essential precondition that “Diffusion” will happen properly ?
- xii) Beta-exotoxins are composed of adenine, glucose and alluric acid that inhibits RNA polymerase enzymes by acting competitively with a vital component of RNA synthesis. What is that component ?
- xiii) What is the permissible limit for Arsenic in drinking water according to Central Public Health Engineering Authority of India ?
- xiv) Write down the formulae for at least two respiratory electron acceptors in the process of denitrification.
- xv) In which order of reaction is the rate of reaction independent of the concentration of the reactant(s) ?

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 10 = 30$

2. You are appointed as the consultant for a construction company with TOR (Terms of Reference) “Advise on waste water treatment plant for municipal sewerage” The project is for a city coming up in a deserted piece of land for a target population of 6,00,000.
- a) Identify the probable activities (with your logic in brief to choose the activity) that are going to contribute to the pollutant load to the waste water.
 - b) In case the water consumption for the city dwellers is 200 l/capita/day, how would you quantitatively fractionate the supplied water amongst activities ?
 - c) What sort of treatment would you recommend for the waste water from the city ?
 - d) Discuss the merits and demerits of the options of treatment.



3. a) How many types of sludges are considered in discussing the options for waste water treatment systems ?
- b) Describe the characteristics of the sludges obtained from different forms of primary and secondary clarifiers.
- c) Describe the typical sludge treatment scheme by free hand sketch and describe the functionalities involved.
- d) What type of sludges are treated by dissolved air floatation (DAF) technique ? Describe the principles and functioning of DAF.
4. What is biogeochemical cycling ? Describe such cycles for Carbon, Nitrogen and Sulfur. Identify one bacteria you think most effective in each cycle and describe their functions in brief.
5. What is innate immunity ? How does the bacteria *Bacillus Thuringensis* employ the toxin it produces in self defense ? Describe the relevant structural features of the CryA protein vis-a-vis their functions. Discuss the biosafety issues in relation to the release of transgenic plant species with biopesticide transgenes.
6. Describe aerobic biodegradative pathways for aliphatic and aromatic organic molecules. Who are biosurfactants ? How are biosurfactants employed by the bacteria in biodegradation ? Describe the employment of Flowthrough Bioreactor system developed to remove, recover and concentrate metals from ore.

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GROUP – C
(Long Answer Type Questions)

Answer any *two* of the following.

2 × 15 = 30

7. Trace the path of Bioethics from its inception to its current form.
8. Explain the ethical points that need to be considered during selection of a field of scientific research in a developing country.
9. Bioethics can be stated as a necessary evil. Explain with examples.
10. Why and when was the need for legal implementation of Bioethics felt ? What were the steps taken for implementation of the Bioethical Principles as they are in the current form ?
5 + 10
11. What was the Barcelona Mantra and how was it different from its predecessor ?
12. What are the advantages and disadvantages of multidisciplinary research over mono disciplinary research ?
8 + 7
13. Mention the features that are essential for an invention to be patentable. What would be the major points in a patent disclosure form ?
9 + 6
14. What are the fundamental substantive provisions of the Paris Convention in connection to IPR ?